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Supply Authorities' Expenditure

What Are the Limits ?

WE have no delusions about the effects of war upon the whole of the nation's organisation. "Business as usual" sounded well in 1914, but we soon found it to be a hopeless aspiration. Nevertheless, even in a "total" war some skeleton of the original structure must be preserved, otherwise the eventual reconstruction, always most difficult, becomes an even greater strain.

The transition from peacetime to war economy should, moreover, be as gradual a process as possible. A sudden change-over may result in thorough dislocation in a number of directions, contributing nothing to the winning of the war, but rather injuring the public morale.

The Treasury Ban

This preamble is introductory to a consideration of the situation of the "domestic" side of the electrical industry which involves supply authorities, electrical contractors and manufacturers. One of the first things that happened on the declaration of war was a ban on borrowing by local authorities and the issue of capital by companies, except with the consent of the Treasury, which, of course, is not easily obtainable. In the case of local authority electricity undertakings, too, expenditure of surplus revenue for capital purposes was prohibited, save with the permission of the Electricity Commissioners.

The immediate result was the virtual all-round suspension of schemes for the hire and hire-purchase of domestic apparatus. As a very large proportion of the domestic appliance business is done in this way, the manufacturers found themselves deprived of their principal outlet, while hundreds of electrical contractors whose work consisted largely of providing home installations were pulled up short.

This has led to a reasoned appeal being addressed by the leading water-heater manufacturers to those organisations which have it in their power to remedy or mitigate the effects of the cessation of hire and hire-purchase business. This document is reviewed on another page of this week's issue. Electric cooker manufacturers are contemplating parallel action, and both groups should certainly receive the support of the supply authorities.

Matters were made worse by the announcement of the electricity rationing scheme: this, coupled with the loss of lighting load, dealt a severe blow to the supply undertakings. It is true that public opinion forced the Government to suspend rationing (or at least the reduction of the allowance) although its effect is not yet spent, and we feel that now some alleviation is needed in the other matter.

A great deal seems to have been left to the discretion of the Electricity Commissioners, although we suppose that where expenditure of any magnitude is involved the Treasury has the last word. The Commissioners, acting under Treasury instructions, circulated in September a memorandum on the subject of capital expenditure, stressing the fact that they could only give sanctions to expenditure upon extensions or additions designed to meet war requirements (including the special cases of reception areas), agricultural development, or public need. The first two classes are easily identified: it is in respect of the third that the Commissioners are called upon to exercise discrimination, and we do not envy their position between the Treasury Scylla and the public Charybdis.

"Public Need"

So far we have come across only two interpretations of the term "public need." The first was in connection with an application from Southport to be allowed to proceed with services to houses newly wired for a supply. This was probably an easy decision. The other instance has a wider scope. The Stoke Newington Borough Council suggested that "public need" should be held to include the provision of facilities for lighting, cooking, water heating, etc., in private houses where they did not exist or had become inadequate for the needs of the occupier. According to the local Electricity Committee, the Commissioners agreed to this interpretation and added that they "would not feel precluded from sanctioning the borrowing of reasonable amounts in respect thereof." Now Stoke Newington is an evacuated not a reception area, and so special considerations did not apply. Therefore, it may be taken that the Commissioners are prepared to regard with favour (or at least without disfavour) a certain measure of ordinary development.

In this matter they are relying upon the common sense of engineers and managers who have to realise that there must be limitations in wartime due to the

redirection of the nation's financial and material resources. We have reason to believe that the connection of new domestic premises, the strengthening of existing services and the supply of apparatus will be regarded as legitimate development to meet the public need. On the other hand, changing over from gas to electricity (or vice versa) would not be viewed favourably, and assisted wiring schemes appear to fall into the same category. It could be argued that a change-over from coal to electricity is in the public interest, but whether the Commissioners would consider that the "public need" proviso applied, if it were attempted on any scale, is a "moot point." The Commissioners evidently have no desire to suspend hire and hire-purchase schemes, but the limitation placed on extensions automatically reduces the need for them. It should, however, still be possible to operate them within the limits thus imposed, and, as we have said, it is most undesirable that this strong link with the public should be broken.

Obligation to Supply

WHAT is the position of a supply authority which cannot obtain sanction to expenditure upon services to would-be consumers who demand a supply of electricity? In other words, does the Treasury ban on expenditure over-ride Section 30 of the Electric Lighting (Clauses) Act, 1899, which imposes a penalty not exceeding 40s. a day upon undertakers who fail to provide a supply? The question has been raised by the engineer and manager of a provincial supply company who asks if there is any emergency legislation protecting undertakings in this respect. The answer to the last question is in the negative. On the broader aspect we think that any undertaking summoned by a disappointed applicant for a supply could probably shelter behind the proviso in the Section that "in no case shall any penalty be inflicted in respect of any default if the Court are of opinion that the default was caused by inevitable accident or *force majeure*." Ignoring the first saving clause, surely the power of the Treasury constitutes *force majeure*.

Control at Luton

WHEN the post of borough engineer at Luton became vacant early this year a dispute arose regarding the scope of the new engineer's powers. A section of the Council desired to subject him to some measure of control by the town clerk and borough treasurer, while the chairman of the Electricity Committee was to have charge of the showrooms and canvassing. As a result candidates called up for interview withdrew their applications. Later, in March, it was announced that Mr. R. Dean, of Coventry, had accepted the appointment upon receiving an assurance that he would not be hampered in his management of the undertaking. Apparently this did not finally settle matters, for we now hear that in future Mr. Dean is to be designated general manager and chief engineer, and will be solely and directly responsible to the Electricity Committee for the general management of the complete electricity undertaking, including direct control of the showrooms and all sales and development activities.

Nobody's Babies

THE leaderette bearing this title in our issue of November 24th has drawn replies from Mr. A. Brammer, secretary of the A.S.E.E. (in the form of an article, page 728) and from Mr. A. H. Banks, employers' industrial adviser, N.J.I.C. (in the shape of a letter). Mr. Banks accuses us of inaccuracy when all we did was to call attention to the reluctance of either the National Joint Board or the National Joint Industrial Council to father installation foremen and inspectors. Mr. Banks says that the London District Council Schedule includes installation inspectors, but he also goes on to say that it is possible to grade these officials under the N.J.B. Schedule, so probably we should have called them "everybody's babies," but on the principle that everybody's business is nobody's business maybe we were not so inaccurate. The fault lies, however, not in the Board and Council but in the nature of the positions which seem to vary considerably from undertaking to undertaking. This lack of definition is dealt with by Mr. Brammer.

The Smaller Undertakings

THE war has relegated the matter of reorganising electricity distribution to the background, and thus the main reason for the existence of the Committee of Smaller Municipal Electricity Supply Undertakings apparently disappears—for the time being at all events. But Mr. A. J. C. DeRenzi, hon. secretary of the Committee, thinks that there is good cause to keep the Committee in being as there is a danger of the smaller undertakings suffering under a "dictatorship." When normal conditions return, he says in his annual report to the Newcastle-under-Lyme Corporation,

> "it will be necessary to make it very clear that the industry is quite capable of managing its own affairs, as is being abundantly proved at the present time, and will strongly resist undue interference by individuals outside the industry itself who have had no practical experience on the commercial side of the industry or the special problems appertaining thereto."

It may be a long time before the reorganisation question again becomes a subject of immediate concern, but there are, no doubt, many matters of special importance to the smaller undertakings which the Committee could keep an eye on.

Group Buying

AN advertisement by the Incorporated Association of Electric Power Companies in this issue is a manifestation of an interesting development in the direction of bulk purchasing by a group. It calls for tenders for quantities of from 10,000 to 20,000 low-priced kettles to be retailed under the Association's own mark. Manufacturers of domestic appliances who have spent large sums on design and development and have built up goodwill for their branded products may not regard such departures as this with favour, in spite of any merits which the scheme may possess. It is to be hoped that "low-priced" will not mean inferior quality which would injure the electrical cause.

Charges in London

READERS of *The Times* who live in the area supplied by Central London Electricity, Ltd., must have had a shock to learn last week from a letter from Lt.-Col. J. T. C. Moore-Brabazon that the company intended to abolish the two-part tariff and revert to the "archaic practice" of flat rates. We immediately got into touch with the company which, as we anticipated, assured us that nothing of the kind was contemplated. This misunderstanding on the part of a former Parliamentary Secretary to the Ministry of Transport, who was largely concerned with the 1926 Electricity Supply Act, was most unfortunate.

The Bikker Light

INVISIBILITY from the air has been claimed to result from the use of the Bikker lighting fitting—a Dutch invention that appears to have been successful in certain applications. The fitting is not new, having been introduced about eighteen months ago, but recent events have caused the general public to take an interest in its possibilities, or perhaps we should say its impossibilities. The design is based on well-known optical principles. In essentials it comprises a lamp at one end of a long tube, in which a system of diaphragms causes the light to be directed in horizontal parallel beams of very high intensity. For signalling or for work requiring an unusually strong spot-light effect the method doubtless has its uses, but it is subject to obvious limitations. One of these is glare, e.g., in the eyes of drivers of on-coming vehicles if used on the road; the other is that nothing outside the beam would be discernible. The effects of the reflection of a beam from bright surfaces might be observable from above, and this consideration, as well as eyestrain, makes it unlikely that the device will make any appreciable contribution towards mitigating the "black-out."

BEET SUGAR PRODUCTION

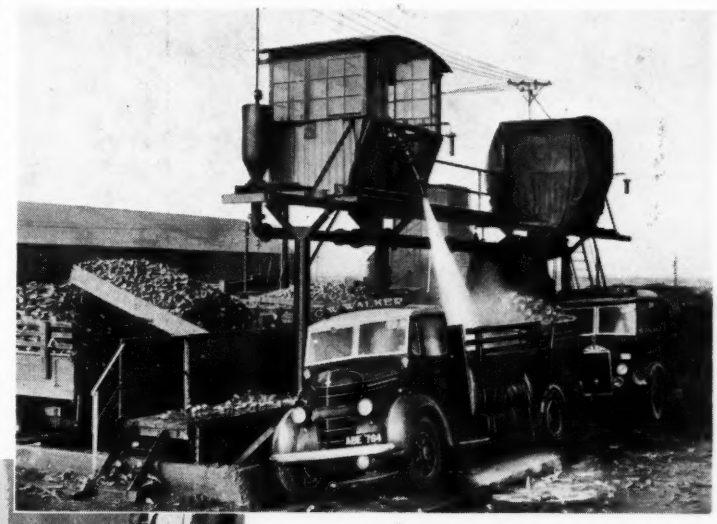
Interesting Processes at a Lincolnshire Factory

THE growth of the beet sugar industry in this country since the passing of the Beet Sugar Subsidy Act of 1924 is not widely appreciated, although it has a very special significance at the present time of national emergency. Altogether, there are 18 factories in this country, situated mostly in East Anglia, which produce about 25 per cent. of the country's sugar requirements.

Electrically, the development is of great importance, too, and with the object of obtaining information on this aspect we recently visited the Bardney Beet Sugar Factory of the British Sugar Corporation, Ltd. Private generation is employed, and because of the large steam requirements for process heating and the fact that the production period extends over only about a quarter of the year, it is difficult to see how the supply problem could have been solved satisfactorily otherwise. Although the product from this particular factory is "raw" sugar only, and its refinement is normally carried out in other factories of the organisation at more convenient times of the year, the far greater part of the electricity consumption for sugar production as a whole is in connection with the processes up to the "raw" sugar stage.

We saw a few steam drives, mainly for pumping, but by far the greater part of machinery driving is effected electrically by about 2,500 HP of motors supplied from 2,000-kW of generating plant. Mr. A. G. Raby, the chief engineer, looked up a recent day's electricity consumption for us. It was 32,650 kWh. Bearing in mind that a little of the factory driving is by steam, this is absorbed in a factory output of 400 tons of sugar. A good average figure for the sugar content of beet grown in this country nowadays is 17 per cent, so that the quantity of beet which has to be handled is about 2,400 tons per day. Actually, the factory plant is designed to deal with 100 tons of beet per hour, and was originally built for 1,000 tons per day. The coal consumption of the factory is about 200 tons per day, but this is practically all for process heating and pulp drying.

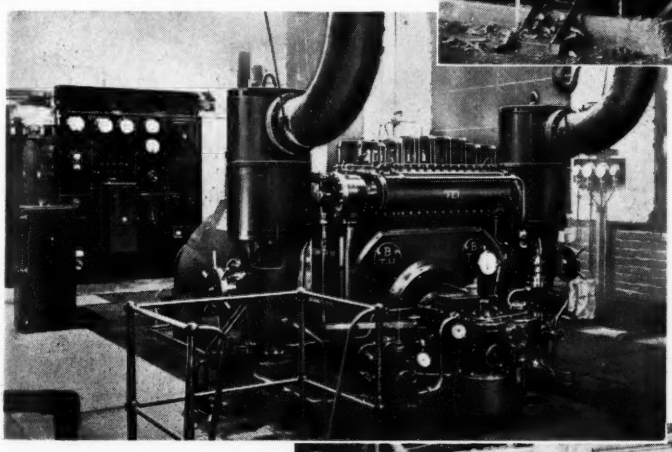
Lorries, each containing about six tons of beet, draw up alongside an "Elfa" tower and are side-tipped. From the tower the beet is subjected to a water jet at 26 lb. per sq. in. from a 4-in. nozzle on a swinging arm, and in this way the beet is washed out of the lorry in about one minute. The water jet is produced by a centrifugal pump directly coupled to a 60-HP, 1,450-RPM squirrel-cage motor which is controlled by an auto-transformer starter and an Ellison oil circuit-breaker.



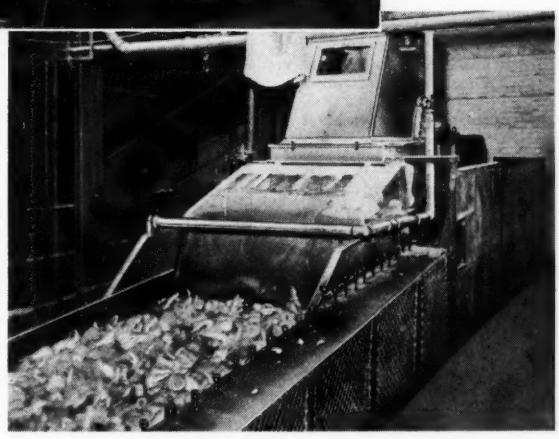
Beet being washed out of delivery lorry

From the lorries the beet falls into a concrete flume system in which it is carried by the water into the factory, immediately inside which a weed catcher and a stone catcher are arranged over the flume. The former is an endless-chain affair and rakes hanging from a chain dip into the flume and remove the weed. From a "well" in the bottom of the flume the stone catcher removes stones on the bucket-dredger principle. These two equipments have a small group drive with belt transmission from a 5-HP squirrel-cage motor.

The delivery end of the flume feeds the beet and water into the rim of a beet wheel. This is about 25 ft. in diameter and rather like the wheel of a water-driven corn mill, with inside "paddles" which elevate the beet to a washer and a perforated band around it, through which the water drains into a sump. The washer is a longish trough-like tank in which several propeller-like arms revolve with a central horizontal shaft, cleaning the beet by the agitation and propelling it from the feeding to the delivery ends of the tank. The wheel and the washer have a common drive from a 40-HP slip-ring motor,



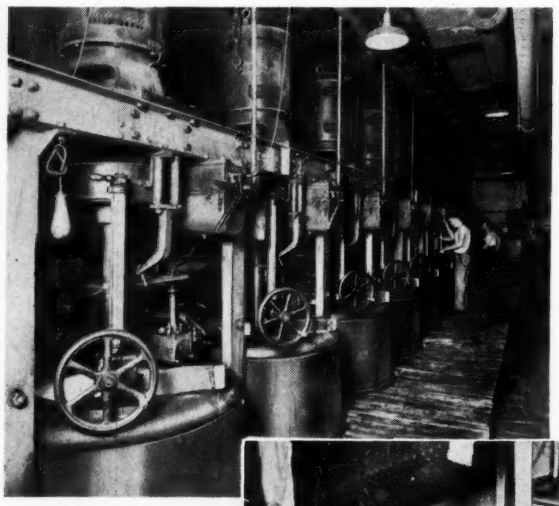
2,000-kW pass-out turbo-alternator set



Picking table and elevator both driven by a 30-HP motor

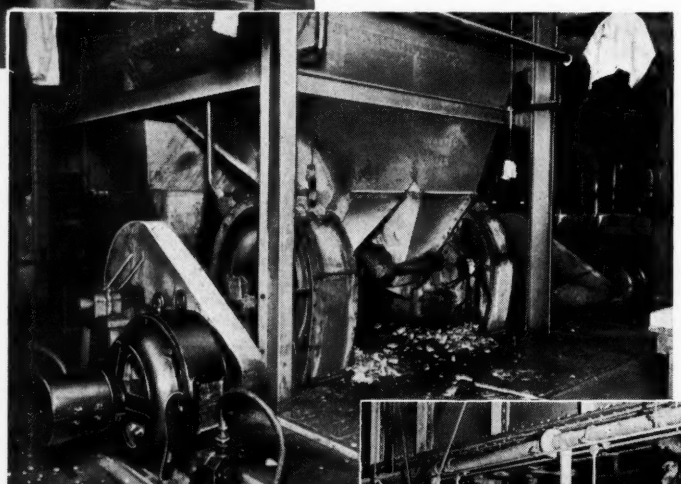
and transmission to the wheel is *via* a pinion engaging a gear around the periphery of the wheel, the actual overall reduction being from 540 RPM at the motor to about 10 RPM at the wheel. The water from the beet wheel is conveyed to the settling tanks of a "Borsig" clarifying plant some distance from the factory by a 4,500-GPM sewer pump driven by a 150-HP motor through an 18-in. belt. The main factory water supply is provided for by two 160-HP motor-driven pumps in a pump-house remote from the factory building.

At the delivery end of the washer the beet passes into the boot of a vertical bucket elevator which, after a 65-ft. lift, feeds it to a short but wide travelling picking table from which foreign matter is removed by hand while the beet travels along on large rolls.



Molasses and sugar being separated in centrifuges

There is a group drive for both the elevator and the picking table from a 30-HP. slip-ring motor served by a drum-type starter and an oil circuit-breaker. At first there is gear transmission with an actual reduction of 725 to 10 RPM, and then a chain drive serves both the elevator and table. From the picking table the beet falls into an Avery automatic weighing machine, and here we had the opportunity of checking the factory flow by timing the weighing operations—one ton at a time each thirty seconds.



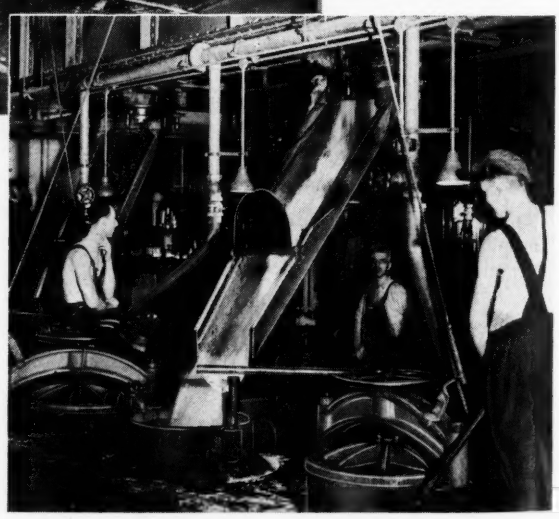
Each beet slicer is driven by a 40-HP motor. Actual sugar extraction takes place in the diffusion plant seen on the right

A hopper below the weigher feeds four slicing machines, in each of which a series of 48 knives is arranged in frames around the rim of a wheel which turns at 100 RPM. The knives are specially shaped to cut the beet into "cossettes"—long, thin slices, triangular in section, which have the largest possible area exposed for extraction. Each slicer is driven by a 40-HP slip-ring motor served by a tramway-type controller and an oil circuit-breaker with push-button "on" operation. Chain transmission from the 585-RPM motor imparts the 100 RPM to the knife wheel shaft.

Two scroll conveyors carry the cossettes from the slicers to the diffusing plant in which the actual sugar extraction takes place. Each scroll serves 12 diffusers and is driven by a 10-HP, 970-RPM squirrel-cage motor with an auto-transformer starter and an oil circuit-breaker, and a six-to-one speed reduction is afforded by chain transmission. Each battery consists of a number of metal cells, each of which is chute fed with about 4½ tons of cossettes. Extraction is on the principle of osmosis. The process flow from the diffusing plant is twofold; raw juice follows one line leading to the main product—sugar, and the exhausted cossettes follow another line for a valuable cattle food by-product.

To follow the main-product line first, the raw juice is first well circulated through raw-juice heaters. These are very similar to surface steam condensers, the juice passing through the "water circulating" tubes and the heating medium—vapour from third-effect evaporator—passing over the exterior surface of the tubes. The next process is carbonation, in which by first mixing milk of lime with the juice and then passing carbon-dioxide through the mixture, various impurities such as organic salts in solution are turned by chemical and physical actions into lime-salt precipitates which are removed, with particles of beet tissue, by filtering. There are two carbonating processes with a filtering between them, and there is a final filtering after the second carbonation.

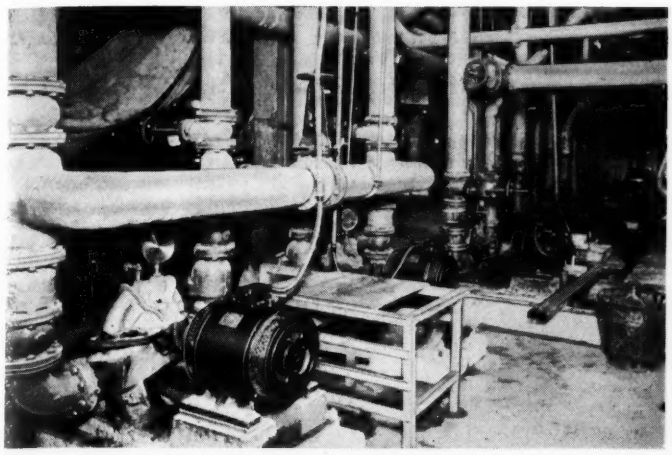
After the second filtering in pressure-type clamped cloth equipments and subsequent treatment with sulphur-dioxide for bleaching, the cleansed raw juice is concentrated to a syrup in evaporators by steam passed through tubes immersed in the syrup container. In the five evaporators well over 2,000 tons of water is evaporated from the juice every day. The thick dark concentrate is then heated before being pumped by a 15-HP motor-driven centrifugal pump to tanks from which it is drawn into vacuum pans at the top of the building, where it is further concentrated under vacuum to "graining-point," a state in which the solution becomes super-saturated and cannot hold the sugar in a dissolved condition. Vacuum is maintained by means of two 30-HP motor-driven pumps. The vacuum assists in quick boiling of the syrup and prevents caramelisation through boiling at low temperature.



Considerable pumping operations are necessary to convey the liquids and syrups according to their states at different parts of the process flow, the drive motors varying from 25 to 50 HP. All the heating and evaporating is effected by means of exhaust steam from the generating plant, and the water used for the actual

sugar extraction in the diffusing plant is taken from the evaporator condensers. Live steam is bled into the exhaust system under the control of a reducing valve to maintain a pressure in the process heating system of 25 lb. per sq. in.

The sugary mass which is run off from the vacuum pans at the correct moment of crystallisation and con-



Typical line of juice pumps

centration is fed to centrifugal separators in which the molasses is driven off through the perforated sides of the containers, leaving the sugar crystals packed around the walls to be ploughed off, so that they leave the separator at the bottom. There are two lines of these centrifuges, one of which gives a second separation to the syrup which is discharged from the other machines after it has been reboiled in vacuum pans.

Each centrifuge is driven by a 20-HP vertical-spindle two-speed (500 and 1,000 RPM) squirrel-cage motor with direct-on-line starting by means of an oil-immersed two-speed controller. The two speeds serve for duty cycle work, of course, the low speeds being required during loading and discharging. These specialised drives were supplied by the Macfarlane Engineering Co., Ltd. In the first place these direct drives were solid coupled, but experience has led to the introduction of friction blocks between each motor and machine as a help in the severe duties to which the motors are subjected.

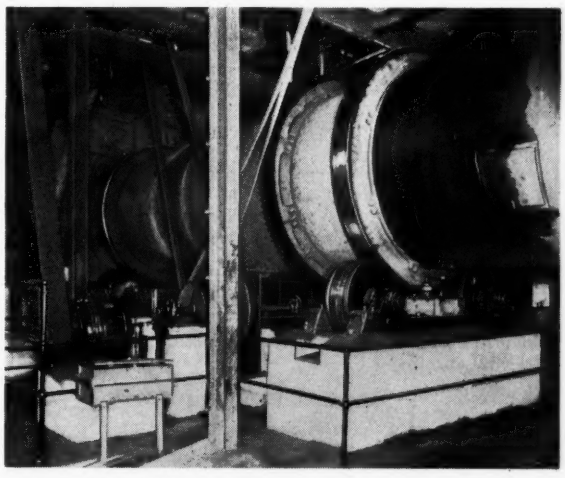
Under the centrifugal separators the sugar is received by a scroll conveyor with a 25-HP drive, and *via* this conveyor and an elevator it is carried to a granulator, dried, and passed down to the sacking department. The granulator is rather like a cement kiln, its cylindrical body being revolved as the sugar passes along inside it in one direction and warm air passes in the other. It is driven by a 25-HP motor. The molasses passes from the separators into large tanks to which it is pumped to outside storage tanks by means of a 10-HP slip-ring Crompton Parkinson motor with gear transmission and rotor resistance starting.

To revert to the diffusing plant: the exhausted beet leaves the diffuser cells as a mixture of pulp and water and is transferred to a pulp house by two 50-HP, 960-RPM directly coupled s.c. motor pumps, one of Laurence, Scott manufacture. The pulp mixture is discharged into a drag with a 20-HP s.r. motor and belt drive in which the pulp is separated from the water. From the drag the pulp is carried by a scroll conveyor with a 40-HP s.c. motor drive to a bank of six presses. These are group driven from a 110-HP s.r. motor which first transmits by chain to a line shaft with a 3 to 1 reduction, and from the shaft to each press there is a belt drive with a similar reduction. The motor speed is 730 RPM.

A pressed pulp conveyor and elevator then carry the pulp to a feeder which serves a double-time scroll conveyor with its two sections revolving in opposite directions, so that one line carries the pulp to the far end and throws it over to the other line for a journey back in the opposite direction. This procedure may be repeated continuously to avoid a blockage in the flow line, and an important duty of the conveyor system is mixing the pulp, to which is sometimes added a quantity of molasses during its passage through the conveyor. These scroll conveyors are driven by a 40-HP s.c. motor with a chain drive to an open reduction gearing with a 6 to 1 ratio. The scrolls serve the feeders for three pulp dryers which, like the sugar granulators referred to, are similar to cement kilns and are each driven by a 60-HP motor. There is belt transmission from the motor to an overhead shaft and then similar transmission down to a worm gear which engages with a cog gear on and around the cylinder of the dryer, and the actual overall reduction is from 960 RPM at the motor to about one RPM at the kiln drum. The dryer motors are s.c. units and have auto-transformer starters. From the dryers the pulp is taken to the sacking station.

The generating plant consists of a 2,000-kW 3,000-RPM B.T.H. turbo-alternator and two 750-kW, 300-RPM G.E.C. reciprocating sets which are used as stand-by since being superseded by the turbo set. All of these machines generate at 440 V, three-phase, 50 cycles. The prime movers are all non-condensing, the turbines operating against a back pressure of 30 lb. per sq. in. and the steam engines discharging at 15 lb. per sq. in. The sets are supplied with steam at 160 lb. per sq. in. from six Babcock and Wilcox boilers, and the average steam flow is 135,000 lb. per hour. Hagan automatic boiler control is installed for the operation of the dampers and stokers. There is stock accommodation for 11,000 tons of coal and the daily requirement of 200 tons is handled by scraper and belt conveyors.

All the motors throughout the factory are supplied



One of the pulp dryers

at 440 V, three-phase, and from the open-front generation and distribution switchboards in the power-station v.i.r. cables on wall racks serve iron-clad distribution boards throughout the factory. The lighting —mostly with "Mazdalux" fittings—is all at 110 V and supplied by a 100-kVA B.T.H. transformer. There is a 30-kW oil engine generator set which serves for the lighting supply during factory shut-down periods. Except where otherwise indicated, practically all the motors are of B.T.H. manufacture, as is a good deal of the starting equipment, although many of the oil circuit breakers are of the Ellison industrial type.

We are indebted to Mr. J. F. Ellis, local manager of the British Sugar Corporation, for permission to visit the factory, and to Messrs. C. T. Cawley, works superintendent, A. G. Raby, chief engineer, and Thomas Holland, electrical engineer, for their help.

SCHOOL CANTEENS

Their Utility and Educational Value

By F. M. Evans, M.B.E., M.A. (Cantab.)

(Director of Education, Erith)

MODERN schools tend to be spread out over a wide area in order to give every part ample fresh air and sunshine. This extended character, and often the complete separation of the buildings from one another, give rise to problems in heating and in the supply of hot water. Also for preparing the mid-day meal the all-electric kitchen or school canteen, given a reasonable price per kWh, becomes of interest to educational authorities and directors of education on the basis of costs alone. An important attraction is that electrical equipment may be kept almost "surgically" clean, and in my experience, it can be thoroughly relied upon, while the flexibility in arrangement which it makes possible greatly assists the designer.

Hot water is needed in liberal quantities in the sculleries and water heaters should be designed to meet the calculated needs and to obviate the necessity for long lengths of piping. The elimination of labour for stoking and other difficulties associated with the coke-fired boiler are telling points in favour of electrical methods. Where electricity is taken at night and the heated water is stored until required the following day, a case can be made for supplying the low-pressure hot-water radiators for warming the buildings from the same system, coupled with electric boosters. Such a system must, however, be designed from careful calculations of the probable supplies of heat and hot water required.

The electric kitchen will require installations of ovens specified to meet the actual requirements of each school. While both roasting and baking can be done in these, it is usual to have a separate baking oven. A pair, at least, of steamers or steaming ovens is required for cooking such things as puddings, certain vegetables and similar foods. Electrical vegetable boiling pans can be fitted with tops in which foods can be kept warm. Fish fryers in which the oil is kept boiling by electric heat and from which a hood takes the fumes away into the open air are also most useful, as the change offered by fish in the menu proves very welcome to school children. Hot chambers (with hot plates above) for the warming of plates, keeping cooked foods hot, and dishing out and carving may be in the kitchen or at the servery near the dining hall. Heated food trolleys may be required for taking cooked food from the kitchen for considerable distances.

For the boiling of foods in pans, boiling tables (with utensils designed for use with them) incorporated in the tops of the ovens are usually necessary. A grill is a very useful piece of apparatus, whilst a stock pot to provide bases for soups is an almost essential part of the equipment of a kitchen of this kind, not to mention cake and dough-mixing machines. For use in the scullery or preparation room, an electrically driven vegetable cleaner, of which there are several excellent types on the market, is a desirable adjunct. In almost any well-run kitchen the refrigerator can, over a period of years, save its cost in food kept from wasting. It provides, moreover, a valuable demonstration to the children of the use of refrigeration.

Kitchen Planning

The actual lay-out of a kitchen will depend upon a variety of factors—the number to be catered for, the building available and the amount which can be spent, to name a few. Each scheme should be especially drawn up by an expert to ensure economy in consumption of electricity and in the provision of equipment. Separate switching of each piece of apparatus and the provision of pilot lights are important. The kitchen must be planned to reduce to a minimum the walking done by the staff. Correct circulation of movements should be kept in mind, *e.g.*, incoming raw materials, outgoing cooked foods, return of dirty dishes and scraps.

Island ovens in batteries will be better than ovens placed against walls. Fish fryers, potato mashers, boilers and probably steaming ovens are best placed near the walls. A water urn which can give an ample supply of really boiling water is essential when tea, coffee or cocoa are to be made in large quantities. Boiling tables of the island type are the most suitable. Apparatus should be of the best chromium-plated type or mottle enamelled in order to facilitate cleaning.

For a kitchen designed to cook for 200 to 250 people each day, I would suggest the installation of the following apparatus:—Boiling table, 18 kW; hot cupboard and bain-marie, 13 kW; cabinet oven, 10 kW; double-oven range, 10 kW; boiler, 7 kW; fish-fryer, 6 kW; vegetable boilers (two), 6 kW each; stock pot, 5 kW; steaming oven, 5 kW; pastry oven, 3 kW; potato peeler, 0.5 kW; mincing machine, 0.5 kW.

Electric kitchens can be seen in action at the London School of Economics, the Regent Street Polytechnic and at many other well-known educational establishments. It is my considered opinion that it is well worth while for a school which is providing new or remodelling its old kitchens to obtain schemes and estimates for making them electrical, especially when all the meals of the day have to be cooked there. The truth of this is borne out by the experience of many education authorities. One authority has, for instance, standardised its method of supplying hot water in its schools by fitting at each point or group of points an electric water heater.

Teaching Electrical Methods

Electric cookers are undoubtedly popular in schools. They are not always fitted with pilot lights, as they should be, and occasionally elements burn out, but as a rule they give very little trouble. After using them in the domestic subjects lesson, girls gain confidence in their manipulation, which results in many cases in the installation of electric cookers in their own homes. One authority noted a large increase in the installation of electric cookers after the reorganisation of the schools of the borough and the establishment of domestic subject classrooms in which the local standard pattern of electric cookers, with others, had been installed. In the same way the use of other domestic electrical apparatus in the school economy can serve for demonstration and education with appreciable reactions in the children's homes.

One electricity undertaking in a town near London provides regular exhibitions and demonstrations of domestic electrical apparatus in the senior schools. Parents' visiting days are arranged to coincide with them with very good results from the educational and publicity point of view. Visits of children to showrooms and power stations are also fruitful in their effects upon their education for life in an electrical age.

E.D.A. Activities

ALTHOUGH the issuing of the fuel rationing forms remains in suspense, the British Electrical Development Association has arranged with the Mines Department that the blank space on the forms shall be used for the purpose of overprinting instructions for the reading of meters. The overprinting can be arranged by individual supply undertakings, but the Association offers to carry out the work or supply stereos. If Form FLO/12 is to be reprinted at a later date the Association will request the Secretary of Mines to include the illustrated instructions.

Electricity undertakings in evacuated areas may find themselves with large numbers of displaced cookers, while those in reception areas may experience a shortage. In these circumstances E.D.A. offers to act as a "clearing house" by bringing the undertakings into touch with a view to transferring cookers.

The E.D.A. diary for 1940 was well in hand when war commenced. Accordingly, it will be available as usual and orders should be placed as soon as possible. As we have already reported, three E.D.A. calendars for 1940 have been prepared. The Association is anxious to receive orders for the minimum number of 100,000 to enable it to proceed with the production of the calendars.

Two major additions are being made to E.D.A.'s cinema library in the shape of films dealing with water-heating and rural electrification. The latter should prove of particular value at the present time. Four smaller films, on water-heaters, cookers, lighting and irons, have also been produced and will be available at the small fee of £1 a week per copy inclusive. Arrangements with local cinemas can be made by the Association.

The demand for window displays appears to be keeping up very well and in order to meet a probable reduction in manufacturers' displays a series of suggestions for simple window arrangements is being prepared and will be issued shortly.

Although the Association has had to suspend "straight sales" advertising for the time being, it aims at keeping electricity in the public eye. To this end it has inserted in national papers a "prestige" advertisement drawing attention to the part which electricity is playing in the winning of the war—in the home as well as in industry.

CATHEDRAL CARILLON

British-built Equipment for San Francisco

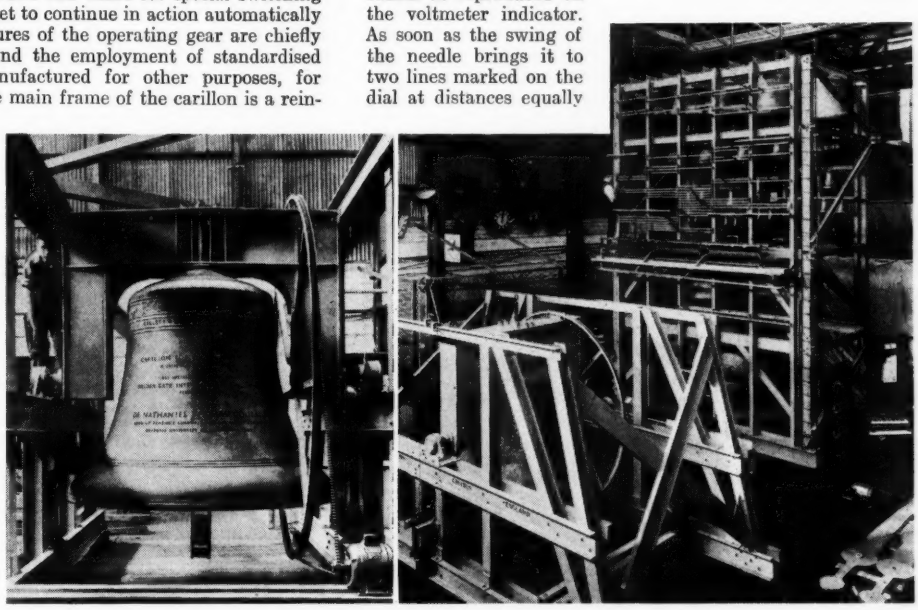
AN exhibit of considerable interest at the Golden Gate International Exposition, San Francisco, U.S.A., was the electrically operated carillon of forty-four bells which will eventually be erected in the tower of Grace Cathedral in the same city.

In addition to electro-pneumatic operation, the electrical ringing of the 5½-ton bourdon bell called for special switching control to enable it to be set to continue in action automatically until switched out. Features of the operating gear are chiefly simplification of detail, and the employment of standardised components, already manufactured for other purposes, for ease of maintenance. The main frame of the carillon is a reinforced rectangular structure of steel girders which enables straightforward drawwires to be used to couple the pneumatic pistons to their respective bell clappers. The pneumatic pistons, and their electro-magnetically operated valves, are mounted on a platform which is fitted to one side of the main frame.

The consequent shortening of the linkage considerably improves the clapper action, but the exposed position rendered it essential to make the mechanism of the carillon completely weatherproof.

To take full advantage of the crisp action of the short connecting levers and draw wires the compressed-air cylinder, usually mounted alongside the compressor, has been dispensed with and is replaced by special air-storage chambers cast integrally with the bases of the piston bank units.

The electro-magnetic valves operate at 50 V and are controlled by relay circuits of the automatic telephony kind, each with a condenser of the Mansbridge type to prevent sparking. Above the relay panels is a solenoid-operated mercury switch controlling the air-compressor motor and supplies for other essential circuits. A small pressure cylinder, whose plunger closes a master contact on the relay circuits, prevents the operation of the carillon until there is a sufficient supply of air for actuating the pistons.



Left: The bourdon bell, showing the method of ringing by a Crompton "Tork" motor. Right: The two sections of the complete carillon before being mounted together

Playing Mechanism

The automatic tune-playing machine consists of a sprocket drum carrying a paper band, in which are perforations permitting a series of contact fingers to complete the operating circuits of the relays by making contact with a metal roller forming a common return path for all relay circuits. The sprocket drum is rotated by a fractional-horse-power motor and a worm reduction gear, and is provided with a rheostat for speed control. The changing of paper bands to give alternative melodies is provided for by mounting both the contact fingers and the sprocket drum on pivoted arms which can be swung outwards to enable the bands to be lifted off and on.

The hand keyboard of the piano type completes appropriate circuits by means of contact fingers and a common return, while the automatic machine has clock mechanism which completes a starting circuit at any predetermined time.

The automatic ringing apparatus used for the bourdon bell is considerably simpler than previous types, for it dispenses with brakes and clutches, and works directly, the motor being coupled to the bell wheel by a length of roller chain. The bell is hung on ball-bearings and attached to a headstock that enables a portion of the weight of the bell to be used as a counterbalance. The headstock was entirely fabricated by electric arc-welding.

The 2-HP, 220-V driving motor is of the squirrel-cage type and was specially constructed for its rather unusual duty of continual reversal of rotation. For starting up the swinging of the bell there is a switch-box on which are mounted a reversing handle and a central-zero voltmeter which serves as a bell-movement indicator. By moving the reversing handle from the "off" to the "start" positions and back again, a small initial swing is given to the bell, and is built up by several such movements, the moving of the reversing handle being timed by the operator to coincide with the bell movements as reproduced on the voltmeter indicator. As soon as the swing of the needle brings it to two lines marked on the dial at distances equally spaced from the zero line, the reversing handle is pushed right over to the "run" position, and the bell will then continue to ring until the handle is replaced at "off."

As the reversing handle is moved in building up the arc of the bell, contacts are made which operate a contactor on the bell frame, so energising the motor and cause it to swing the bell. When the amplitude of the bell arc is sufficient, contact-making mechanism attached to the headstock takes over this function, and maintains the correct switching of the contactor indefinitely. The indicator on the switch box is controlled by a small rheostat which is coupled to the bell pivots, and varies a small current supplied for the purpose. The operator is kept aware of the movement of the bell at all times, and it is not even necessary for him to be within audible range of its note in order to start it successfully.

A safety switch on the headstock will cut off all current supplies automatically if the arc of the bell should exceed the amplitude set as a safe limit, and once this safety switch has operated, the bell cannot be re-started until the circuit has been closed manually.

The design of the whole installation provides for operation by unskilled persons, and the arrangement of bells in the carillon frame is somewhat unusual, for the structure of the cathedral tower rendered it necessary to divide the larger bells into two groups and place these at the top and bottom of the frame, with the smallest bells between. An even response from both large and small bells would not have been possible if any other lay-out had been employed.

The carillon bells are tuned on modern harmonic principles, and the whole installation was carried out and erected by Gillett & Johnston, Ltd., of Croydon.

Dialling Extension Numbers

A DEVICE for dialling direct to telephone extension numbers has been invented by two Russian scientists, states a *Reuter* message from Moscow. On being connected to a private branch exchange a caller is enabled by the device to dial to the extension required. Thus the entire process is automatic, without any need for the services of an operator. The inventors have also designed a very small automatic branch exchange for use in large offices and institutions which is stated to be inexpensive, portable and easily installed.

INSTALLATION INSPECTORS

Their Place in the Electrical Scheme

By A. Brammer

AT an interview with a local Electricity Committee in the North-West of England in the middle of November, I was asked why there was no uniform method of dealing with the conditions of employment of installation inspectors. I replied it was mainly due to the fact that the inspectors were "nobody's babies." The use of this term for the heading of an editorial note in the ELECTRICAL REVIEW of November 24th emphasised the view I had expressed, and it is a fact that it aptly describes the present position of electrical installation inspectors. The unfortunate position in which the inspectors find themselves is mainly due to the general lack of appreciation of the duties which fall to the lot of these employees who are doing a really good job of work if they fulfil the duties which should form the basis of proper and competent inspection. Not only is the position an important one but those engaged in this work should be fully trained engineers.

Mr. Brammer is General Secretary of the A.S.E.E.

There is a divergence of opinion in the country as to what should form the duties of an electrical installation inspector, and what the qualifications should be for the position. On the one hand we have the local authorities who think the men should simply use a "Megger," and that semi-skilled labour will do. On the other hand there are the Electricity Committees and chief engineers who appreciate that inspection to be done at all, should be done thoroughly and efficiently, and have moulded their staff accordingly. Between these two there is a body of opinion which thinks that an employee of the operative type is sufficient, and that the inspection should be of a purely routine character.

Lowered Standard

It is, of course, a well-known fact that men have been employed as installation inspectors whose knowledge of the electrical industry and of electricity was negligible. They have been trained to take round a "Megger" and, of course, the conditions and rate of pay have been commensurate with such a routine job. This practice has had its effect on general conditions, and it is regretted that cheap labour was originally employed for non-technical positions, and such labour allowed to gradually develop into positions for which a higher standard of training is obviously necessary and a better system of payment desirable. Development in this field has been somewhat haphazard; one finds varying duties, designations and rates of payment throughout the industry, and it is difficult to comprehend why there should have been this lack of understanding or co-operation in a sphere of activity which, to say the least, has an important bearing on the proper development and use of electricity.

That such an unsatisfactory position existed was brought rather forcibly to the notice of the Association of Supervising Electrical Engineers about two years ago when that Association published its report on "Compulsory Wiring Regulations and Registration for the Electrical Contracting Industry." The scheme suggested in the report visualised the employment of inspectors under independent control, and in the discussions at meetings throughout the country, the importance and responsibilities of installation inspectors were brought into prominence, while at the same time the inspectors themselves began to appreciate a little more their place in the "scheme of things," and to realise they had a more useful contribution to make, not only in efficient and proper inspection work, but also in encouraging development on the right lines. It was appreciated that if progress was made with the suggested scheme, inspectors of the right type would be necessary to enforce observance of the rules and regulations.

Many applications for membership from installation inspectors have been examined by the A.S.E.E., and it is no use shutting our eyes to the fact that a fair percentage could not qualify for admission. On the other hand, some had the qualifications and experience but their duties were most meagre. The Association, as the result of many requests gave the situation careful consideration, and expressed the opinion that an unsatisfactory position which had taken many years to grow would take some time to rectify. It may be of interest to record that one of the steps taken has been to obtain assurances from certain local authorities, that in future, appointments of installation inspectors shall be confined to practical and technical men. It is encouraging to say that there has been no difficulty in securing such assurances.

That the rates of pay and conditions of installation inspectors vary considerably is common knowledge, and information shows that they receive payments from as low as £3 5s. per week to £330 per annum; some are paid at hourly rates and others at weekly rates. There is no uniformity and it would have been advantageous if Electricity Committees or their advisers had paid more attention to conditions governing their electrical installation inspectors, and attempted to rectify what is an unfortunate state of affairs. The position of these inspectors was well put by a correspondent in one of the technical journals when he said:—

> "The fully qualified man should have his status raised from that of a glorified workman whose presence on a new job is just tolerated by contractors. . . . Since the duties of a competent inspector are to supervise and inspect the work of highly paid contractors, to advise on projected installations, and change over private plant—to see that their supply authority practises what it preaches—to pass an installation finally, and be ready to take responsibility if anything goes wrong, it will be seen that the post requires a full training in actual wiring, in the theory and practice of domestic appliances, motors, switchgear, and instruments, conversance with the rules with respect to neon signs, cinemas and technically to be able to stand their ground with highly trained contractors, who obviously will not see eye to eye with them on various points."

He went on to express his disgust to find supply authorities who, if they were competently advised would know better, advertising these posts at less than £4 per week, and taking on men who turn the handle of a "Megger," and if the needle goes up say the job is all right, and if it goes down are not certain if it is wrong.

All that this correspondent states may not be agreed, but the picture is not overpainted. In fact he omitted to point out that an electrical installation inspector should also be a man possessing tact and common sense and should be something in the nature of a liaison officer. He should also be competent to deal with all the technical problems which arise, and when it is remembered that he has to inspect and pass work carried out under the supervision of a staff foreman, supervising electrical engineer or chief engineer, his knowledge and authority should be equal to such a task.

Suggested Remedy

The remedy for the position as at present existing is certainly not on the lines of the decision of the Hammersmith Borough Council reported in the ELECTRICAL REVIEW of November 24th, to "limit the qualifications of applicants to bring them within the ambit of the Industrial Council schedule." If this means anything at all, the qualifications of an electrical inspector for that borough will be limited to those of an operative electrician, and the duties of the position will be limited to fit those qualifications and experience. In fact, none but operative electricians must in future apply.

I do not intend, or desire, to convey that there are no operative electricians competent to carry out the duties of an installation inspector in the fullest sense of the term, but it must be obvious that in the main, operative electricians do not possess the necessary experience and technical knowledge. The work of electrical inspection is bound to increase in importance as the industry develops, and the need for stricter and more competent inspection is acknowledged. It is surely begging the question to infer, as in the case of Hammersmith Borough Council, that because neither the Joint Boards nor the Industrial Councils consider that these men come within their scope, that adequate conditions cannot be negotiated with an organisation to which the inspectors themselves decide to belong.

While heartily disagreeing with the outlook of the Hammersmith Council and other councils which take what I believe to be a restricted view of the situation, I do not suggest that

(*Continued at foot of next page.*)

SHOP WINDOW LIGHTING

New Regulations for Displays and Signs

ANNOUNCEMENTS this week by the Ministry of Home Security of an experimental relaxation of the black-out restrictions so as to permit dim shop window lighting and signs will be warmly welcomed by shopkeepers, especially with the approach of Christmas. Outlining the conditions of window lighting at a meeting held on Monday at the Lighting Service Bureau, Mr. William Mabane, Parliamentary Secretary to the Ministry, emphasised the fact that the black-out must remain an essential feature of national defence and that the continuance of the experiment depended on everyone "playing the game" and observing the few simple rules laid down. The devices suggested for procuring the permitted degree of lighting had been made as simple as possible and, though manufacturers would have suitable apparatus on the market almost immediately, shop-keepers could improvise apparatus from cardboard boxes or biscuit tins.

Two alternative methods of lighting a shop window are allowed—a simple fitting for general lighting and a cabinet for lighting special displays. The same general conditions apply to both fittings. No light must be allowed to enter the window from the inside of the shop, and no mirror or other large reflecting surface may be placed in the window. The light must be directed from above on to the goods displayed, and no direct light must shine outside the window.

Construction of Fitting

One lighting fitting or cabinet may be used in each shop, provided that where the window is more than 20 ft. wide one fitting or cabinet may be used for each ten ft. width of window, the fittings or cabinets being spaced not less than 10 ft. apart. The amount of light provided by each lighting fitting for general lighting must not exceed that given by a 25-W lamp in a container finished in matt black inside, through a slot not larger than 4 in. by ¼ in. covered with tissue paper, the bulb being 2½ in. from the slit. No light other than that in the fitting or cabinet may be used to light the window.

The fitting suggested for general lighting is shown in fig. 1. It consists of a closed box made of cardboard, thin wood or metal, the size being about 6 in. by 6 in. by 9 in. The inside of the box can be either painted matt black or lined with black paper. A hole 1⅛ in. in diameter is made at one end to take a lampholder, the centre of the hole being 3¼ in. from the side of the box in which the slit is to be made. A slit 4 in. long and ¼ in. wide is made in the box opposite the centre of the lamp, one sheet of tissue-paper being stuck over the outside to act as a diffuser. The box is fitted next to the glass near the top of the window in such a way that the light is directed on to the goods displayed, but no direct light from the slot shines outside the window. If the window is more than 8 ft. high, the box should be fixed not less than 8 ft. from the floor.

The alternative method of lighting, namely, the illuminated display cabinet, a sketch of which is shown in fig. 2, is covered by a specification, BS/ARP35 (published by the British Standards Institution, 28, Victoria Street, S.W.1, price 3d.) Three sizes of cabinet have been standardised, having display apertures 1 ft. high by 1 ft. 6 in. wide, 2 ft. 6 in. high by 2 ft. wide, or 6 ft. high by 3 ft. wide, the corresponding distances from the window glazing facing a street being 1, 2 and 4 ft.

Each cabinet is fitted with a lighting fitting, containing a 15-W pearl lamp, giving a specified light distribution curve with a maximum illumination at 30 deg. above the horizontal. The essential features are a display platform, a light trap well, a display aperture, a screening pelmet and baffle for light cut-off. The cabinet is constructed from opaque material, all the interior surfaces being treated with a dead matt-black material. No cabinet is to be placed in a window above the ground floor.

With regard to illuminated signs, the Ministry has decided that they can now be allowed in windows, doorways or lightlocks of shops, hotels, restaurants, and places of public entertainment under certain conditions. The dimensions of the sign must not exceed 3 ft. in width and 2 ft. in height, and the maximum aggregate area of the illuminated letters or symbols must not exceed 144 sq. in. The letters may be illuminated so that (a) the maximum brightness at any point does not exceed 0.02 ft. candle, and (b) the sign is inconspicuous at a distance of 100 ft. Flashing signs may not be used.

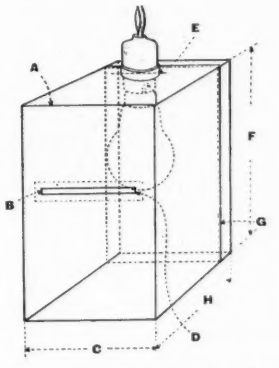


Fig. 1.—General lighting fitting.

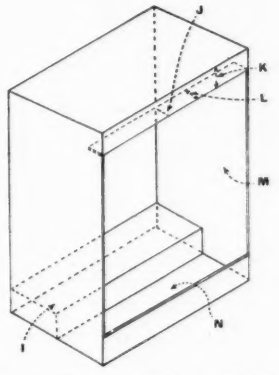


Fig. 2.—Display cabinet

A. Distance between centre of hole and this edge to be 3¼ ins. B. Tissue paper. C. About 6 ins. D. Slot 4 ins. long, ¼ in. wide, covered with tissue paper, and on a level with the centre of the lamp. E. 1⅛-in. hole. F. Length sufficient to leave at least 2 ins. clear between the bottom of box and the end of lamp bulb. G. Lid. H. About 6 ins. I. Display platform raised above bottom of box. J. Special electric fitting mounted behind this pelmet. K. Screening pelmet. L. Pelmet baffle. M. Open front. N. Light trap well

The sign must be so constructed that, when illuminated, no light is visible other than from the illuminated letters or symbols. It must be mounted so that the face is vertical and must be placed inside a window or within a doorway. The number of signs displayed may not be greater than the number of entrances normally used by the public. In the case of entrances serving more than one shop, &c., the total area of all signs displayed must not exceed the total area and maximum area of illuminated letters as mentioned above for one sign. The sign may not be used above the ground floor.

All the apparatus mentioned may be illuminated only when the premises are open to the public and must be extinguished immediately an air raid warning is sounded.

Manufacturers are not being slow in catering for the new demand, and already the General Electric Co., Ltd., announces that it is in a position to supply lighting fittings for shop window display cabinets and illuminated shop window signs to conform with the requirements detailed above. A very simple adaptor device has also been produced for making shopkeepers' existing box signs comply with the requirements.

Installation Inspectors (*Concluded from preceding page*)

the blame for the present unsatisfactory conception of the installation inspectors' position rests entirely on the shoulders of the local authorities or their chief engineers. The inspectors themselves must accept some measure of responsibility in that they have knowingly or unknowingly contributed to the present unsatisfactory arrangement by their acquiescence in those conditions, and it is necessary they should appreciate that the remedy lies to a great extent in their own hands. On them rests a responsibility not only to themselves, but to the electrical industry of which they form a part, by contributing their quota to efforts made to put their calling on a better and sounder basis, by believing that by doing so they are rendering a service to the improved organisation of the industry and its fuller development.

It is necessary for the electrical installation inspectors to appreciate that until they develop those ideas and express their views through some central organisation in a proper manner they must not expect their present difficulties to be solved. By such a movement the electrical industry itself is bound to benefit, for by encouraging the employment of efficient engineers for inspectorships and the payment of adequate remuneration for such efficiency, better service will be rendered and improved relationships will be established between the supply authorities and their consumers and contractors.

Mining in India

THE 1938 annual report of the Chief Inspector of Mines in India reveals that 136 collieries used electricity, as compared with 124 in 1937. Further evidence of the growth of mechanisation is the fact that 186 coal-cutting machines were employed last year against only 140 in 1937 and 110 in 1936, all being electrically operated. Electricity was also used in 21 metalliferous mines (an increase of one).

In the Courts

Libel Action Fails

IN the King's Bench Division last week Mr. Justice Wrottesley had before him an action brought by Lieut.-Col. George C. Stowell, Kingswood, Surrey, against Mr. Arthur John Fippard, of Wallington, Surrey, and the Electric Supply Corporation, Ltd., to recover damages for alleged libel contained in a letter to plaintiff which the defendant Mr. Fippard wrote (typed by his secretary) in his capacity as chairman of the Electric Supply Corporation, to the plaintiff on September 7th, 1938, imputing that the plaintiff had neglected his duties as secretary to the defendant company, who were joined as defendants and accepted responsibility. The defence was a denial that the letter which the plaintiff complained of was written maliciously.

Mr. Slade, in opening the case, said that the plaintiff was appointed secretary of the defendant company in June, 1923, at a salary of £250 a year, which by 1937 had been increased to £1,250. The company had a large number of subsidiaries, including the Hendon Electric Supply Co., Ltd., which paid the larger part of the plaintiff's salary. Mr. Fippard became a director of the defendant company and up to the spring of 1938 his relations with the plaintiff were of the happiest character. In March, 1938, the defendant company negotiated for the sale of its shareholding in the Hendon Co. and one of the matters discussed in the course of the negotiations was the compensation to be paid to the plaintiff. By August 11th the sale had been completed and then or shortly afterwards Mr. Fippard accused the plaintiff of disloyalty to the defendant company and asked him to resign. The plaintiff denied this and refused to resign. Mr. Fippard said he would give plaintiff two days to do so, accusing him of incompetence and inefficiency and stating that if plaintiff did not resign he would dismiss him, which he afterwards did by giving plaintiff three months' notice.

The letter, which was the basis of the present action, stated that whatever plaintiff might have done in the past he had not carried out his duties satisfactorily recently, whilst his apparent indifference to the welfare of the company left Mr. Fippard no alternative. While it was obvious that the plaintiff had great ability in some directions this fact did not militate to any extent against the incompetence he had shown in other directions.

The plaintiff gave evidence denying the allegations made against him by Mr. Fippard and on November 30th at the close of plaintiff's case Mr. Beyfus, K.C., for the defendants said that the action was a misuse of the law of libel. The defence to the action was that Mr. Fippard when he wrote the letter believed the statements which he made regarding the plaintiff and which plaintiff complained of.

Mr. Fippard, in giving evidence, said that having regard to what had happened, he had honestly, when he wrote the letter, come to the conclusion that plaintiff had not carried out his duties efficiently.

After hearing the addresses of Counsel for the respective parties his Lordship, in giving judgment, said he had come to the conclusion that there was no malice on the part of Mr. Fippard when he wrote the letter to Col. Stowell. The result was that the claim for damages failed against both defendants and the action therefore would be dismissed with costs.

Claim for Fees Settled

At the Leeds Assizes on November 27th, Mr. W. O. Pepper, consulting electrical engineer, brought an action against Joseph Hoyle & Son, Ltd., Longwood, claiming fees in respect of an electrical scheme carried out in the defendants' mills.

The plaintiff stated that in 1932 and 1933 he was called in to advise the company's engineer in connection with a proposal to install electrical plant in the mills but the cost of electricity was then considered too high. In 1936, however, electricity prices were much lower and a scheme prepared by the plaintiff was adopted providing for the supply of energy by the Huddersfield Corporation in conjunction with the company's own generating plant. Mr. Pepper maintained that his remuneration had been agreed at 5 per cent. of the cost of the plant and equipment installed together with certain expenses incurred in connection with the work.

When the case was called the plaintiff's Counsel announced that a settlement had been reached, the plaintiff agreeing to accept £300 with costs. Judgment was accordingly entered for the agreed amount.

Water Heating in Wartime

Manufacturers' Appeal

A GROUP of leading British makers of electric water heaters has issued a statement of views on the situation created by the withdrawal of hire and hire-purchase facilities by the electricity supply authorities. Copies of the statement have been sent to the Minister of Transport, the Electricity Commissioners, the Central Electricity Board, the British Electrical Development Association, the Electrical Association for Women, and electricity supply authorities.

It points out in the first place that hitherto practically all water heaters installed were provided through supply authorities on hire or hire-purchase terms. The restrictions on borrowing by local authorities has led to the public being deprived almost completely of the opportunity of obtaining water heaters on these terms. This result is contrary to the desire of the Government that there shall be as little interference as possible with normal trading conditions.

As a result of the almost complete cessation of purchases of water heaters by supply authorities the manufacturers are faced with the undesirable prospects of discharging skilled and other operatives and of allowing plant to stand idle. This militates against the export of apparatus at competitive prices and, moreover, will prevent the industry from helping to absorb the surplus labour and materials which will be available at the end of the war. It is most desirable to maintain an industry which in the last few years has grown to be of national importance.

The statement then sets out the advantages of water heating by electricity. The installation of a water heater does not involve the consumption of additional fuel and as it is thermostatically controlled and lagged does not waste energy. Electric water heating saves labour in many directions. Its employment for A.R.P. purposes is not confined to first-aid posts and cleansing stations; it has a great scope in households in which during a raid there is no need to cut off the electricity supply. The use of electricity results in a considerable reduction in fuel transport charges and water heaters form a useful load during off-peak hours.

The statement concludes by stressing that for the reasons given electric water heating should be encouraged and that can only be done by reinstating the hire and hire-purchase schemes.

The members of the Electric Water Heater Manufacturers' Association are Aidas Electric, Ltd., Berry's Electric, Ltd., Geo. Bray & Co., Ltd., Ferranti, Ltd., the General Electric Co., Ltd., Heatrae, Ltd., the Hotpoint Electric Appliance Co., Ltd., the Jackson Electric Stove Co., Ltd., Johnson & Phillips, Ltd., Archibald Low Electrics, Ltd., A. Reyrolle & Co., Ltd., Santon, Ltd., the Simplex Electric Co., Ltd., and Thermics, Ltd. The chairman is Mr. E. G. Batt (G.E.C.) and the secretary is Mr. H. Y. Ross, 1, Frederick's Place, Old Jewry, London, E.C.2.

Electric Vehicles

IN the House of Commons on December 5th Mr. Levy asked the Secretary for Mines if he had considered the development of electric-battery propelled vehicles as a means of conserving petrol supplies; and if he would give all assistance in the scope of his department to any move in this direction by industry.

Mr. G. Lloyd said that vehicles propelled by electric batteries already enjoyed certain advantages both in respect of taxation and because the electricity they used was not subject either to duty or rationing. Moreover, the weight of the battery was not taken into account in assessing the speed limit category for the vehicles. These advantages should encourage the development and adoption of electric battery vehicles in suitable circumstances in the same way as they were expected to do in the case of vehicles driven by producer gas. While he viewed with sympathy and interest the development of methods of transport which result in conserving petrol supplies, he would not feel justified in present circumstances in recommending more favourable treatment in these respects for battery traction than was being given to producer gas.

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

ON November 28th the Luton Borough Council approved the recommendation of the Electricity Committee to extend the duties of **Mr. Rennie Dean,** M.I.E.E., M.I.Mech.E., electrical engineer and manager, who took up his appointment at Luton on June 1st this year. In future Mr. Dean is to be designated general manager and chief engineer, and will be solely and directly responsible to the Electricity Committee for the general management of the complete electricity undertaking, including direct control of the showrooms and all sales and development activities.

Mr. A. C. Thirtle, A.M.Inst.C.E., A.M.I.E.E., whose appointment as deputy chief engineer at Swansea has been confirmed by the Corporation, was an articled pupil of the late Mr. F. M. Long, M.I.E.E., and after holding various appointments in the Norwich Electricity Department, he has been engaged since 1926 in the development of the Thorpe power station, a base load selected station of the Central Electricity Board, South East England Area. He was engaged in the commissioning of the station, which had been designed by Preece, Cardew & Rider, and he has been responsible to the city electrical engineer for various extensions. During 1935-36 he was resident engineer in charge of the installation of the 30,000-kW extension operating at 675 lb. per sq. in. pressure and 875 deg. F. steam. Since the end of 1936 he has held the appointment of generation engineer, being responsible for the generation department of Norwich Corporation. For three years Mr. Thirtle was a lecturer on generation, distribution and utilisation of electricity at Norwich Technical College. He has been engaged in many activities in connection with the industry, and he is at present chairman of the No. 8 Area of the District Joint Board of Employers and Members of Staff. Mr. Thirtle takes up his new appointment on January 1st.

Mr. A. C. Thirtle

Councillor S. C. Grimwade, J.P., has been re-elected chairman of the Electric Supply and Transport Committee of the Ipswich Corporation, and **Ald. F. W. Turner** has again been elected vice-chairman.

Sir Robert Renwick, Bt., vice-chairman of the County of London Electric Supply Co., Ltd., has been appointed chairman of the company in succession to the late Sir Bernard Greenwell.

Mr. B. L. Metcalf is resigning his post as chief of the mining section of the general engineering department at the Metropolitan-Vickers Electrical Co.'s works at Trafford Park, to take up the position of chief electrical engineer of the Powell Duffryn Associated Collieries, Ltd., South Wales. Mr. Metcalf was educated at Oundle and Glasgow University and joined the Metropolitan-Vickers Co. in 1923 as a college apprentice. He was in Russia in 1925 erecting plant for the company and from 1926 to 1931 was acting as sales engineer in Kobe and Tokio. He then returned to Trafford Park to join the mining section and took charge of this section in 1935.

Mr. B. L. Metcalf

The wedding took place at Taunton on Saturday of **Mr. K. E. Letherby,** an official in the Taunton Corporation Electricity Department, and Miss N. E. Dembrey, of Taunton. On the evening before the wedding the bridegroom was presented by Mr. L. V. Turner, the borough electrical engineer, with a polished walnut china cabinet, a wedding gift from members of the Department.

With reference to the announcement in our issue of November 24th regarding the appointment of **Mr. W. Buckley** with Luton Corporation Electricity Department, we are informed that he has been appointed an assistant mains engineer with the Department, and not assistant distribution engineer as stated.

Mr. P. R. Blake, managing director of the South Wales Transport Co., Ltd., and Swansea Improvements & Tramways Co., has been appointed a member of Council of the British Electrical Federation, Ltd., and has been elected a director of Tilling & British Automobile Traction, Ltd., United Automobile Services, Ltd., North Western Road Car Co., Ltd., Omnibus Stations, Ltd., West Yorkshire Road Car Co., Ltd., and the Gateshead & District Tramways Co.

Mr. F. E. J. Ockenden, who is chairman of the Meter and Instrument section of the I.E.E. for 1939-40, received his general and electrical training between 1909 and 1913 at the Battersea Polytechnic. After a brief period spent at Woolwich in the telephone laboratories of Siemens Bros. & Co., Ltd., during which time he enrolled as a sapper in the London Electrical Engineers, he was called up and served with H.M. Forces from 1914 until 1919. On his release from the army he joined the staff of Everett, Edgcumbe & Co., Ltd., as research assistant. He later took charge of the whole of the research and development work carried out by the company and was appointed to the board of directors in 1934. He is the author of numerous articles on electrical measurements and instrument transformers, and was joint author with Col. K. Edgcumbe of a paper on this subject read before the Institution in 1927, and of the latest edition of "Industrial Electrical Measuring Instruments" published in 1933. He was elected a Fellow of the Institute of Physics in 1933 and is the author of a number of papers dealing with the practical application of microscopical optics. He was originally elected a member of the Meter and Instrument Section Committee of the I.E.E. in 1931, and was a member of Council of the Institution from 1935 until 1938.

Mr. F. E. J. Ockenden

Lord Bective, chairman of the Bective Electrical Co., Ltd., has now left for Australia to take up his duties as A.D.C. to Sir Malcolm Barclay-Harvey, Governor of South Australia, and in his absence the company's business will be controlled by the three other directors of the company, Mr. W. Wallace Harden (as chairman), Mr. P. Mulvany and Major R. J. Weil, assisted by Mr. E. J. Sutton, chief engineer, and Mr. W. F. Parker, deputy chief engineer.

OBITUARY

Mrs. R. E. B. Crompton, whose death we reported in our last issue, was closely associated with Col. R. E. B. Crompton in his early experimental work on the designing and construction of military steam trains. She also helped him in the founding of Crompton & Co., Chelmsford (now Crompton Parkinson, Ltd.), and as his private secretary assisted in its commercial administration. Colonel and Mrs. Crompton celebrated their diamond wedding in June, 1931. There were two sons and three daughters of the marriage. Mrs. Crompton was buried at Tanfield on November 30th.

Sir Bernard E. Greenwell, Bt.—It is with deep regret that we have to record the death of Sir Bernard E. Greenwell, Bt., chairman of the County of London Electric Supply Co., Ltd., and a chairman or director of its many subsidiary companies, which occurred on November 28th, in his sixty-sixth year. Sir Bernard was educated at Harrow and at Trinity College, Cambridge. He served in the South African War where he gained the Queen's Medal, with four clasps, and after that war he took up his career in the city with the firm of W. Greenwell & Co., stockbrokers, of which he was the senior partner at the time of his death. He was a prominent figure in the city, and had been a member of the Stock Exchange for thirty-seven years. His direct interest in the electricity supply industry commenced in 1921 when he was elected financial director of the County of London Co. He became vice-chairman in 1929, and on the death

The late Sir Bernard E. Greenwell

of Sir Harry Renwick in 1932 succeeded him as chairman. Under his chairmanship the group of companies associated with the County of London undertaking became, by acquisition and extensions, the largest electricity organisation in the country, and as a recognised leader in the industry he gave evidence before the McGowan Committee. Sir Bernard's agricultural interests were also wide, and he gave every support to efforts to provide electricity supplies for agricultural purposes. He succeeded to the baronetcy in 1919. The funeral took place at Godstone on December 1st, and a memorial service was held at St. Michael's, Cornhill, E.C., on Monday last.

Mr. R. Blackmore.—We regret to record the death, which occurred on December 4th, of Mr. Robert Blackmore, M.I.E.E., who was the Central Electricity Board's district manager for North-West England and North Wales. Mr. Blackmore had been in failing health for some time, and as a consequence had tendered his resignation which was to take effect at the end of the current year. He took up his position with the Central Electricity Board on the adoption of the scheme for the area at the beginning of 1929, having previously been engineer-in-chief of the Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board, which position he had held since 1904. Prior to joining the Stalybridge Board he was with the St. James' and Pall Mall Electric Lighting Co., Ltd., and the National Electric Supply Co., Preston, later becoming city electrical engineer of Wakefield. While with the Stalybridge Board Mr. Blackmore also acted as consulting engineer to the Accrington, Fleetwood, Glossop, Leigh, Nelson, Oldham and other local authorities, and his wide experience of textile mills led to his selection as consultant in the electrification of about a hundred factories. Mr. Blackmore became an associate member of the I.E.E. in 1908, and a member in 1930.

Mr. A. E. Nicod.—The last link between the humble start in a house in London with about a dozen workmen and the present works employing nearly 6,000 people of A. Reyrolle & Co., Ltd., has been broken by the death at the age of seventy of Mr. Alfred Eugene Nicod, of Hebburn. Mr. Nicod was a Frenchman, and he acted as Mr. A. Reyrolle's foreman at the small London switchgear workshop from 1890 until 1901 when Mr. Reyrolle removed to Hebburn. Mr. Nicod had charge of the works at Hebburn for several years, and later was in charge of the training centre for the company's apprentices. He retired in 1934. Five of Mr. Nicod's sons and several of his grandchildren are employed at A. Reyrolle & Co.'s works.

Mr. D. Foster.—We regret to learn of the death, which occurred on November 28th, of Mr. D. Foster, of William White & Co., electrical and mechanical engineers, of Cursitor Street, London, E.C.4.

Mr. Walter Norman Ball, of Chelmsford, whose death is announced at the age of fifty-six years, had been with Marconi's Wireless Telegraph Co. at Chelmsford for thirty-five years, being for many years chief of the purchasing department. He was previously with Nalder Bros. & Thompson, of London.

Mr. R. W. Leek.—The death has taken place suddenly at the age of fifty-seven of Mr. Richard William Leek, head of the firm of R. W. Leek & Co., electrical contractors, Newcastle-on-Tyne, and chairman of the Newcastle-on-Tyne branch of the E.C.A. Mr. Leek lived at Heaton, Newcastle-on-Tyne, and had been chairman of the E.C.A. branch for three years. His remains were cremated at the West Road Crematorium, Newcastle, on December 2nd.

Mr. W. A. Dexter.—The death is reported of Mr. William Allinson Dexter, which has occurred in Glasgow. He was a director of Mirrlees, Bickerton & Day for thirty-seven years and was actively engaged in the management of the Mirrlees Watson Co., Ltd. He was also a member of the Council of the British Electrical & Allied Manufacturers' Association.

Prof. C. Vaillant.—The death is reported from Paris of Professor Charles Vaillant, the well-known French radiologist, which occurred on December 4th at the age of seventy-seven. Prof. Vaillant was a pioneer of X-ray treatment and for many years had suffered from a malady contracted during the early days when protection against the rays was not properly understood. Before his retirement in 1921 he was in charge of the X-ray department of the Lariboisière Hospital. He was a Grand Officer of the Legion of Honour, and held the Gold Medal of the City of Paris and the Gold Medal of the Carnegie Foundation.

Correspondence

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

"Nobody's Babies"

YOUR leaderette of November 24th is inaccurate. You say that there is a no-man's land between the N.J.B. Schedule and the N.J.C. Schedule, and that the installation foreman and the installation inspector (charge hand) dwell in this deserted waste.

The installation inspector appears in the London District Council Schedule, and all charge hands are catered for. Foremen generally of all grades are not specifically catered for, although in practice no difficulty arises.

With regard to the N.J.B. Schedule, it is quite clear that any grade of employee (including installation inspectors) who are of technical staff status and performing technical staff duties, would be properly graded under the N.J.B. Schedule, and this often obtains in practice. The difficulty in connection with the installation inspector is that in some cases his duties are strictly limited to those falling within the scope of a manual worker, and in other cases his duties are more comprehensive and include technical supervisory responsibility.

You appear to overlook the fact that there are only a very few key grades named in the N.J.B. Schedule, but the multitude of other technical grades are not in a deserted waste; they are graded under the Schedule. A. H. BANKS.

Manchester, *December 1st.*

[Mr. Banks's letter is referred to in a leaderette on page 724.—EDS., ELEC. REV.]

Transformer Troubles

Regarding the section on transformers in "Electrical Accidents," 1938, the undertaking with which I am associated has been able to stop at the source trouble which might have developed into a number of serious breakdowns or explosions.

Some years ago, when opening up a transformer for inspection, a strong smell resembling petrol was observed, and the paint on the underside of the lid was peeling off. Samples of this paint and of the oil were submitted to a chemist, who reported that the paint had been exposed to petroleum vapour and the oil had been put into a bottle containing petrol. This was categorically denied, and further samples were carefully taken in bottles which were beyond suspicion and the same verdict was given by the chemist, together with the advice to change the oil at once on account of the danger associated with its low flash point.

The smell emanating from this transformer was so objectionable that it was decided to remove the latter from the sub-station (a garage in a residential area) and make a thorough examination of the core and windings in a well-ventilated and lighted building under careful supervision. In order to verify the chemist's reports samples of the oil had also been submitted to the suppliers of both transformer and oil, neither of whom could, or would, put forward a satisfactory explanation for the change in the nature of the oil and both disclaimed any responsibility.

After draining off the oil, the core and windings were lifted out and cleaned. There was a slight deposit of sludge, although the transformer had not been in use sufficiently long enough to account for it. The trouble was eventually traced to defective insulation round a core clamping bolt; static sparking had occurred and resulted in "cracking" the B.S.S. No. 148 Class A.30 insulating oil, resulting in its deterioration and in the formation of gases which lowered the flash point and affected the paint on the lid.

The windings were removed to enable the cores and all insulation to be thoroughly examined and renewed where doubtful. On reassembling and refilling with new oil, the transformer was put back into service and has given no further trouble in that respect. As there were several exactly similar transformers in service it was decided to open up each of them in turn. All were found to be affected by the same trouble, but to a very much less degree, and were treated in time to save the oil. The maintenance staff are now very keen on core bolt examinations of all makes of transformers, both old and new.

Another type of under-oil arcing was found in some transformers where the high-voltage plus and minus mid-point tappings were brought to the top of the oil through a single insulating tube for each phase.

Punctured insulation led to stripping off the tubes and finding in some cases that the copper conductors were very much reduced in section by intermittent arcing between them, since a considerable difference of potential exists between the highest and the lowest tapping leads. The tubes were replaced by spacing pieces. The oil had not been much affected and a recurrence is unlikely as it is not now a common practice to put more than one conductor in each tube. R. W. SPURR.

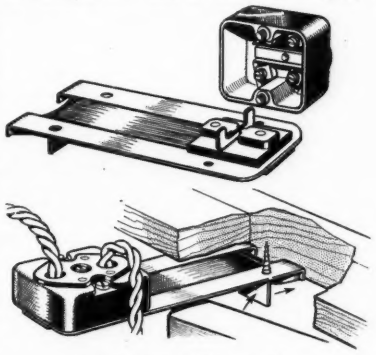
Sunderland, *December 1st.*

NEW ELECTRICAL PRODUCTS

Review of Equipment Recently Marketed

Door-operated Switch

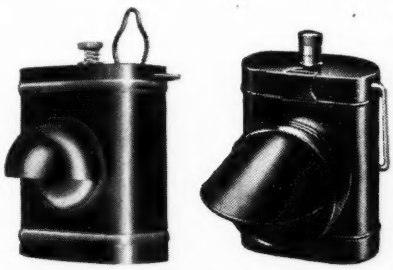
A NEAT and unobtrusive door switch brought out by WM. SANDERS & CO. (WEDNESBURY), LTD., Falcon Electrical Works, Wednesbury, Staffs, for use in the black-out, differs from previous designs in that it does not employ a striker, the closing of the door compressing a spring connected with the switch mechanism. The switch itself actually consists of two independent switches mounted under one cover and these can be used either in conjunction or separately so as to switch a light on or off when the door is opened, switch off the main light and switch on a pilot light, or switch off the main light and operate a bell. The unit, which is suitable for use on AC only, is easily fixed to the door frame.



Sanders door switch

Black-out Torches

Several torches designed to the specifications of the Home Office for use in the black-out are now making their appearance. One, made by the EVER READY CO. (GREAT BRITAIN), LTD., Hercules Place, Holloway, London, N.7, has a 2¼-in. reflector fitted with frosted glass and a cowl to prevent an upward projection of light. It is finished in black stove-enamel and has a stainless steel carrying handle. There is a permanent or intermittent action switch and a holder for a spare bulb. The torch is designed to give eighteen hours' lighting service.

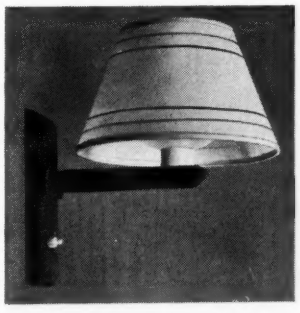


Cossor and Ever Ready black-out torches

A unit of similar design produced by A. C. COSSOR, LTD., Highbury Grove, London, N.5, has a dome-shaped shield and a neat carrying handle enabling the torch to be suspended from a coat button and so leave the hands free.

Pin-up Wall Bracket

A removable bracket that is simply pinned on to the wall has been introduced by KNIGHTSHADES, LTD., Derby Road Works, Montagu Road, Edmonton, London, N.18. A polished brass hook is used in conjunction with a wall pin driven in at an angle. No damage is done to the plaster and the pin remains invisible. A white plastic translucent diffuser provides a shadowless and glareless illumination downwards, while an open top allows light to be reflected from the ceiling.



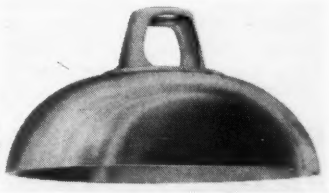
Knightshades pin-up bracket

This principle of direct-indirect lighting is also employed to good advantage in another new line, an all-purpose table lamp, which incidentally is very convenient for A.R.P. lighting in rooms where the black-out is not very effective, since no direct light shines horizontally on to the windows.

Moulded Shades

Announcements are made by BENJAMIN ELECTRIC, LTD., Brantwood Road, Tariff Road, Tottenham, London, N.17, and the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, of the extension of the range of "Coolicon" shades, hitherto available in vitreous enamel and opal glass, by the inclusion of two types made in a white plastic material.

The shade, which is supported on a metal gallery, is so constructed that some of the light is allowed to go upwards to illuminate the ceiling while at the same time preventing undue heating of the lampholder and flex. Moreover, the method of construction ensures that the plastic is kept cool enough to prevent discoloration. The fitting does not therefore deteriorate with use and, though having all the advantages of glass, is lighter and is practically unbreakable except under very severe handling. Damage in transit or while in stock is therefore prevented. It is also non-inflammable.

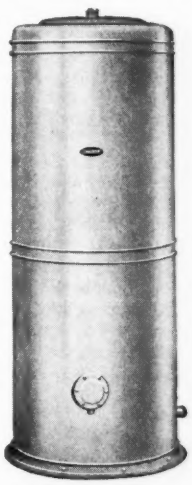


White "Coolicon" shade

It can be fitted to any existing shade carrier b.c. lampholder and there is ample room for a bakelite skirt. The diameter of the shades is 9 and 11 in. respectively, the lamps recommended being 40 or 60 W for the former and 150 W for the latter. The units will find ready sale for shops, offices, schools, etc., as well as for domestic premises.

Commercial Water Heaters

To cater for hot water supplies for such places as farms, dairies and A.R.P. shelters, DRAKE & GORHAM WHOLESALE, LTD., 77, Long Acre, London, W.C.2, have introduced a new range of "Dragor" commercial water heaters of similar design to the standard domestic models but modified to suit their purpose and at the same time they are lower-priced. Chromium has, for example, been dispensed with in most cases, but the lagging has been increased. Outlets and inlets are arranged to suit each job, both in position and size, and any loading can be provided, to suit three-phase AC if desired.



"Dragor" commercial type water heater

The heaters are mainly of the pressure type and of large sizes from 30 gal. up to any capacity. They are not stocked in a finished state but are ready for completion in a day or two. If necessary, special dimensions can be arranged, although normally an external diameter of 24 in. is used for up to 100 gal. capacity. The "Densacone" feature is not fitted, as the elements are horizontal and of the immersion heater type. The heating unit can be of flameproof construction if desired and thermostatic or contactor control can be fitted. Overnight heating is also catered for.

All-purpose Conduit Box

The "Corbelux" all-purpose conduit box marketed by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, can be used for practically every normal situation for both flush and surface work throughout a complete installation. In addition to its use as a junction box, it will accommodate any standard switch or socket, including all 2-in. mounting B.S.S. accessories such as lampholders and ceiling roses. This obviates the need for stocking boxes in a large number of types.

The one-way "Corbelux" box consists of a soft grey iron casting, 3 in. by 3 in. by 1½ in., with parallel sides of ¼-in. section. Conduits up to 1 in. in diameter can be terminated in any or all of the four sides or at the back, while there remains liberal interior space for equipment and cable. In the back of the box is a hole tapped 2 BA to receive a sherardised steel screw; this screw fixes either the cover plate when used as a junction box or the plate and grid when used for mounting switches or other accessories.

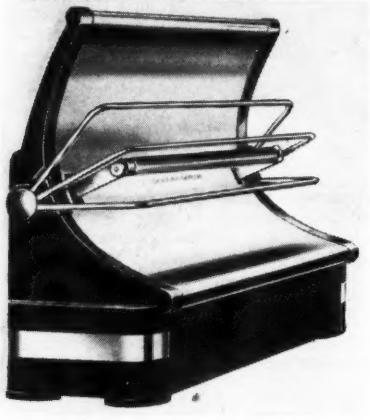
Three different arrangements of plate and grid are available—the overlapping, the protected surface, and the B.S.S. surface types. Any one of these may be centrally suspended

in the box by means of the centre screw, and it is the central suspension of the grids combined with the various plates that provides the great degree of flexibility characterising this "all-purpose" box.

The principle of the one-way box described is extended up to six ways, a complete series of boxes being available. In the multi-way boxes each standard grid (fixed at 2½-in. centres) is independently mounted, thus enabling any combination of accessories to be readily fixed. Each accessory can be fitted with individual 2⅜ in. by 2⅜ in. front plates, so that special multi-way front plates are not required.

Reflector Fire

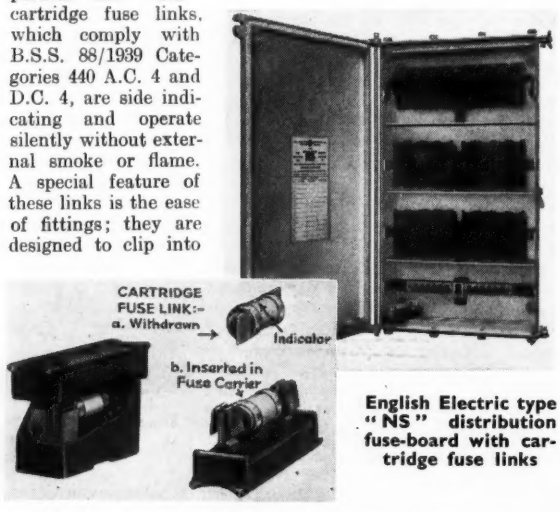
Though solidly constructed in a neat modern design, with chromium reflector, die-cast frame with inlaid chromium bands, nickel chrome element and three-core flex, the new "Swallow" fire introduced by GRAHAM FARISH, LTD., 153, Masons Hill, Bromley, Kent, is being sold at a remarkably low price. The unit measures 11 in. high by 13½ in. long by 5¾ in. wide and is available in four finishes, black, ivory, green and bronze, and three loadings, 500, 750 and 1,000 W.



Graham Farish "Swallow" fire

Distribution Fuse Boards

The type "NS" 440-V, 20-A distribution board just introduced by the ENGLISH ELECTRIC CO., LTD., Stafford, incorporates the "NS" cartridge fuse links, which comply with B.S.S. 88/1939 Categories 440 A.C. 4 and D.C. 4, are side indicating and operate silently without external smoke or flame. A special feature of these links is the ease of fittings; they are designed to clip into the fuse carrier contacts without the use of fixing screws. They do not deteriorate with age and their fittings are of all-moulded construction.



English Electric type "NS" distribution fuse-board with cartridge fuse links

Triple-pole boards, with and without neutral bars, are available from stock, the neutral bars having sufficient terminals for the full number of single-phase outgoing circuits. Undrilled detachable end-plates are provided at both top and bottom and there is adequate cabling space for top and bottom entry. The case is of rigid welded sheet-steel box construction, with cast-iron covers. The standard finish is battleship grey.

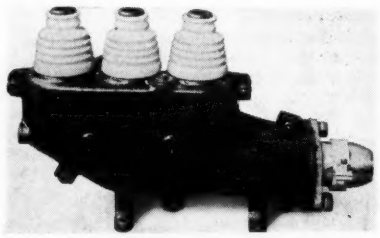
Low-voltage Neon Sign

The use of a special type of low-voltage neon lamp is the secret of the success of a new sign developed by the STERLING ENGINEERING CO., LTD., 166, Piccadilly, London, W.1, for use in shop windows, &c., during the black-out. This lamp, which does not require any external transformer or convertor, is made in two sizes—6 in. and 16 in. long with loadings of 50 and 100 W, respectively. The neon gas is contained in a small tube sealed inside the main tube. The lamp is of robust construction and is guaranteed for a year, though the normal life is about four years.

The lamp is mounted horizontally at the top of the sign in a reflector which not only prevents any upward rays but also diffuses the light over the face of the sign carrying the announcement. In the latter respect the sign differs from most other similar units in that all the available light is utilised and there is no current wastage due to resistances, masking, &c. The light diffusion is restricted to the panel itself and there is no surrounding glow. The sign is weatherproof and a standard panel, wired ready for fixing, measures 10½ in. by 16½ in.

Right-angle Terminal Boxes

New indoor right-angle type horizontal entry terminal boxes made by BRITISH INSULATED CABLES, LTD., Prescot, Lancs, have glands attached by means of set screws or studs. This arrangement enables the boxes to be fitted with either plumbing glands or lead cone glands as may be desired.



B.I. right-angle terminal box for three-core paper insulated cables and insulated outgoing conductors

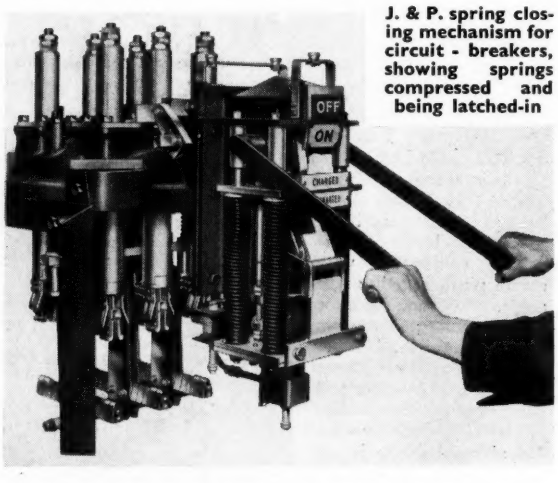
Types are available for three-core paper insulated cables taking 6.6 and 11 kV with uninsulated outgoing conductors and 1, 3.3, 6.6 and 11 kV with insulated outgoing conductors. Armour clamps can be supplied suitable for any type of cable.

The boxes are strongly constructed of cast-iron and are split on the centre line with machine faced joints. Porcelain insulators with ebonite end bushes are provided for the outgoing conductors and the internal fittings consist of cranked sweated sockets supported on a plate of insulating material. Four fixing feet are provided and the boxes are designed for the horizontal entry of the main cable and for filling with cold compound.

Circuit-breaker Improvements

With the sub-station class of circuit-breaker it is not always convenient to have a source of auxiliary power available to operate solenoid- or motor-actuated closing devices. Accordingly JOHNSON & PHILLIPS, LTD., Charlton, have introduced a purely mechanical spring closing device which complies in every way with B.S.S. 116. Particular care has been taken in the design to ensure that the springs have ample stored energy at the end of the stroke to push the contacts home at the stage when the electro-magnetic forces operate against the mechanism.

Actually four separate springs are employed and these are released from the latched-in position by a striker which can be operated either (a) directly by pulling a trigger, (b) remotely by a lanyard attached to the trigger, or (c) by a suitable trip coil, operated, say, from a 30-V battery and with push-button control at any desired point. In addition to the spring release coil the usual protective releases can be fitted. Having closed the circuit-breaker through the spring closing mechanism, the springs can be charged ready for some subsequent closing operation. The company claims that the closing speeds equal those of solenoid actuated mechanism. It is generally possible to fit the mechanism to existing equipment.



J. & P. spring closing mechanism for circuit - breakers, showing springs compressed and being latched-in

ELECTRICITY IN JAPAN

Growth of Power and Manufacturing Industries

(From a Tokyo Correspondent)

JAPAN'S electric power and light industry dates from November, 1887, when the Tokyo Electric Light Company began serving 75 incandescent lamps, using a "home-made" generator. This first commercial station was at Nihonbashi, Tokyo. Three more generating stations were constructed by the same company in 1888, and in September of that year the Kobe Electric Light Company was formed. In the following year the Osaka Electric Light Company was incorporated, and later Kyoto, Nagoya and Yokohama were also supplied with electricity.

By the end of 1890 the generating capacity of public utility companies in Japan was about 1,500 kW, including two 80-kW generators installed in Kyoto in connection with the construction of the Lake Biwa Canal—the first hydro-electric plant in Japan.

Kyoto was the first city to have electric street cars. Using the overhead trolley system, the Kyoto Electric Railway Company opened its line to traffic in February, 1895. The Nagoya Electric Railway Company and others followed in quick succession in 1898 and after.

Power generation and transmission was gradually expanded in scale. Beginning with the success of the Koriyama Silk Spinning Company, Fukushima, in transmitting at 10,000 V over a distance of 15 miles in 1899, long-distance e.h.v. transmission has extended. In 1907, a project to transmit at 55,000 V from a 15,000-kW hydraulic plant at Kamabashi, on the Katsura river, to the capital was successfully completed by the Tokyo Electric Light Company.

The industrial activity following the Russo-Japanese war (1904-05) stimulated the electric power industry tremendously. The generating capacity by the end of 1907 had risen to 110,000 kW from the total of 44,000 kW at the end of 1903, and 780,000 lamps and 8,000 kW of motors had been connected. Steam power predominated in those days; at the end of 1903 a total of 31,000 kW was produced by steam plant against 13,000 kW by water wheels.

TABLE I.—INCREASE IN GENERATING CAPACITY, 1927-1936

Year	Water kW	Thermal kW	Total kW	Rate of Increase (%)		
				Water	Thermal	Total
1927	2,111,087	1,356,044	3,467,131	—	—	—
1930	2,797,637	1,601,677	4,399,314	32.5	18.1	26.9
1933	3,168,705	1,912,037	5,080,742	13.2	19.4	15.5
1936	3,759,334	3,018,088	6,777,422	15.7	57.8	13.7

NOTE.—Private plants are included.

Water-power Progess

Recognition of the economic importance of hydro-electric power led to the organisation of the Government water-power survey in 1910 under the direction of the Communications Minister. Its three-year investigation of the potential water power of the country did much to promote the hydro-electric industry in the years following. Water power outstripped steam power as a source of electricity during 1912, and from that year the rapid development of large water-power sites and the introduction of large-scale generation, backed by enormous amounts of capital, to meet the urgent demand for electricity in the boom years during and after the world war, brought about a new era in the industry. At the end of 1919 the total generating capacity was 1,100,000 kW, consisting of about 700,000 kW of hydraulic and about 400,000 kW of thermal power plants.

It was found, however, that the minimum flow estimated by the Government water power surveyors at a limited number of preferred sites was not the most economical basis, and the adoption of a greater flow as the basis of water power development was the tendency of engineers in those days. Consequently, the survey was repeated between 1918 and 1922 to ascertain the hydro-electric power available for industrial purposes from the standpoint of economic utilisation of water power resources. This second survey revealed that the power available at 2,822 sites was sufficient to produce 4,786,000 kW on the basis of the minimum flow, and 10,051,000 kW at the maximum flow, based on the flow for six months. The annual average was 8,902,000 kW.

These large, preferred sites have been developed one by one, with 200 to 400 km. transmission lines to the load centres. Outstanding among them are the stations of the Daido Electric Power Company on the Kiso, the so-called "Japan Rhine," and the Tenryu, those of the Nippon Electric Power Company on the Kurohe and other rivers in the Hokuriku district, those of the Showa Electric Power Company on the Sho, and those of the Tokyo Electric Light Company in the Koshin-etsu, Joetsu and Aizu districts and on the Agano. Completion of 154-kV transmission lines not only made possible the overhead transmission of power to Tokyo, Yokohama, Nagoya, Kyoto, Osaka and Kobe from out-of-the-way places, but also the interconnection of plants, which provided for an interchange of power and attainment of greater economy in power generation.

TABLE II.—CONSUMPTION OF POWER IN INDUSTRY, 1936

	Supplied by public utilities	Supplied by private plants	Total
	kWh	kWh	kWh
Weaving	714,901,689	68,122,403	783,024,092
Spinning	7,371,124	120,846	7,491,970
Rayon	159,801,369	412,907,756	572,709,125
Woollen goods	103,951,743	2,708,005	106,659,748
Paper manufacturing	361,261,660	283,583,658	644,845,318
Artificial fertilisers	1,618,100,188	151,866,365	1,769,966,553
Industrial chemicals	161,515,533	296,783,289	458,298,822
Soap and toilet articles	4,231,841	914,188	5,146,029
Other ordinary chemicals	68,976,612	9,911,299	78,887,821
Sugar refining	8,038,701	5,229,953	13,268,654
Beer brewing	29,079,106	1,622	29,080,728
Flour production	47,036,548	5,832	47,042,380
Confectionery	6,377,187	—	6,377,187
Steel	379,211,434	461,004,425	840,215,859
Copper	111,726,891	5,786,969	117,513,860
Electrical appliances	59,822,970	—	59,822,970
Machines and tools	145,085,795	5,152,636	150,238,431
Shipbuilding and rolling stock	157,938,879	—	157,938,879
Coal mining	361,943,792	491,761,661	853,705,453
Petroleum	31,216,384	11,320,851	42,537,235
Cement	50,137,569	445,112,869	495,250,438
Printing	7,409,179	40,200	7,449,379
Total	4,595,136,194	2,652,334,737	7,247,470,931

NOTE.—These figures represent the consumption of large companies.

According to the "Statistical Report for 1938 on the Electric Power Industry in Japan," published by the Japan Electric Association, progress in machinery and the lower price of coal have made thermal plants much more economical than at the beginning of their history, and large steam stations have been constructed as reserve plants for hydraulic stations.

Consolidation of Systems

While the number of electric power undertakings for public service has increased with the growth of the industry, the trend has been toward centralisation of ownership and control. Mergers and consolidations were resorted to by so many power companies that a reduction in the number of the electric power undertakings was observed until the revision of the Electric Power Undertaking Law in December, 1932, raised the former private power plants to the status of power supply undertakings.

Power plants for the exclusive use of the industrial owners have also steadily increased in number. At the end of 1936 their total capacity was estimated at 983,450 kW, of which water power supplied 107,787 kW and thermal or other power 875,663 kW. Thus, in 1936, the total capacity in the country for both public service and private use was 3,759,334 kW by water power and 3,018,088 kW by thermal power.

Electric railway lines have gradually spread, and their lengths at the end of 1925, 1930 and 1936 were as follows:—1925, 2,922 km.; 1930, 5,740 km.; 1936, 5,977 km. In addition to the above, the rapid electrification of the Government Railways has also been remarkable:—1925, 180 km.; 1930, 235 km.; 1936, 611 km.

TABLE III.—ELECTRICAL MANUFACTURE

Year	Electrical machines and appliances	Wire and cable	Incandescent lamps	Total
	Yen	Yen	Yen	Yen
1927	94,002,000	107,286,000	25,685,000	226,973,000
1930	106,840,000	73,725,000	23,216,000	203,781,000
1933	112,080,000	79,774,000	23,446,000	215,300,000
1936	201,298,000	165,306,000	21,958,000	388,562,000

The total investment in electric light and power supply and electric traction (excluding the Government railways) exceeded 6,451 million yen at the end of 1936, the earnings of the business as a whole being quite satisfactory. The constant increase in the demand and the improvement of equipment,

mutually stimulating, have played an important part in the betterment of the public service offered by the electric power companies and are promoting the culture of the nation as a whole.

The Japanese electrical manufacturing industry has made marked progress in the last decade. A 75,000-kW turbo-generator has been manufactured, and a Japanese-made boiler which produces 175 tons of steam per hour at 48 kg/cm² and 450 deg. C. is in use at a power station near Tokyo. Table III shows the annual value of electrical production in three-year periods from 1927 to 1936.

Table IV sets out the rates of import duty levied upon a number of classes of electrical goods.

The official returns of imports during 1938 show that the following values of goods were purchased from abroad:—Ammeters, voltmeters and similar meters, 23,236 yen; wattmeters, 33,521 yen; batteries, 44,822 yen; telegraphic instruments, 1,594,383 yen; wireless receiving sets, 100,075 yen; telephonic instruments, 1,783,563 yen; dynamos and electric motors, 2,588,906 yen; transformers, 176,704 yen.

On account of the present "China emergency" a drastic official control has been imposed both of imports and of the purchase of foreign exchange. Permits must be obtained for all imports, and in general they are granted only when the goods are necessary and when domestic manufactures are not available. Permission must also be obtained to make any payment abroad in excess of 100 yen per month.

TABLE IV.—IMPORT DUTIES

Dynamos, electric motors, armatures, etc. ...	Yen 21.33 to Yen 57.24 per 100 kin (according to size).
Transformers	Yen 9.45 to Yen 35.10 per 100 kin (according to size).
Electric clocks	35% *ad valorem*.
Ammeters, voltmeters, and similar meters ...	Yen 199.80 per 100 *kin*.
Wattmeters	20% *ad valorem*.
Watt-hour meters	Yen 70.60 per 100 *kin*.
Accumulators	20% *ad valorem*.
Dry batteries	Yen 23.35 per 100 *kin*.
Other batteries	25% *ad valorem*.
Parts of batteries: electrodes...	20% ,,
,, ,, other	25% ,,
Telegraphic or telephonic instruments and parts (other than wireless receiving sets)...	20% ,,
Wireless receiving sets	40% ,,

NOTE.—100 kin = 132 lb.

Smaller African Markets

Growing Electrical Trade

ATTENTION has been called in the ELECTRICAL REVIEW on several occasions to the growing market for electrical material in what may be termed the minor markets of Africa. This branch of business has been well maintained, largely owing to mining activity, in spite of a certain adverse influence on general purchasing power which has been caused by the low price of a number of staple crops.

The principal items of the electrical imports into these territories in 1938, together with the leading countries of origin, have been extracted from the official trade returns and are shown in the accompanying statements. A note of increases or decreases on 1937 is added for purposes of comparison. It will be seen that the United Kingdom is well ahead in all lines except radio material.

The forecast of trade prospects for 1939 in Kenya and Uganda, made by the Comptroller of Customs in his last report, was that low export values of most of the important crops were to be expected, and that reduced spending power might react on trading conditions, but that the steady maintenance of general industrial progress was an alleviating factor. Crop reports relating to the first half of 1939 speak of weather favourable to coffee and cereals. The whole of the Uganda cotton yield sold, and the total acreage planted by the end of June, was about the same as a year previously. The Comptroller of Customs at Lagos, in his last report on Nigerian trade, said that until the general political situation improved caution would be the keynote of all trading activities in the territory, and he foreshadowed a lean year for imports in 1939. It is so far satisfactory that exports of ground-nuts and cocoa in the first half of this year were greater in quantity and value than in the corresponding period of 1938, although those of palm products declined. In the Gold Coast difficulties in the cocoa trade and the low price of the commodity adversely affected business generally last year and had it not been for the compensating influence of mining activities, the situation would have been worse.

The total exports of Southern Rhodesia during the first half of this year were valued at £5,550,000, only about £100,000 below the corresponding period of 1938, while imports were valued at £4,760,000 against £4,937,000. Thus a healthy favourable balance of trade was maintained. Gold production this year has been slightly above last year's level, and tobacco shipments so far this season have been very good.

In Tanganyika last year poor crop returns depressed the purchasing power of the native population, but the general development of the country continued, as was shown by increased imports of machinery generally. The Comptroller of Customs in his report for 1938 described the outlook on the whole as favourable, given good rains. In August it was reported that the coffee crop was turning out satisfactorily.

Kenya and Uganda

	1938 £	Inc. or dec. on 1937 £
Electric wire and cables—		
Total	45,700	− 11,800
From United Kingdom ...	38,500	− 9,700
,, Germany	3,800	− 1,400
,, Belgium	3,100	− 1,200
Lighting accessories and fittings—		
Total	30,200	+ 11,900
From United Kingdom ...	22,000	+ 6,700
,, Belgium	4,900	+ 2,900
Electric light bulbs—		
Total	8,600	+ 2,600
From United Kingdom ...	6,700	+ 2,200
Elec. goods and accessories not elsewhere specified—		
Total	32,100	− 4,500
From United Kingdom ...	23,000	− 700
,, Hong Kong	600	− 2,600
,, United States ...	2,700	+ 800
,, Germany	3,200	+ 300
Telegraph and telephone material—		
Total*	41,300	+ 27,600
Radio apparatus—		
Total	25,100	− 2,500
From United Kingdom ...	10,900	− 700
,, Holland	6,600	—
,, United States ...	6,700	—
Elec. machinery and parts—		
Total	66,100	+ 8,200
From United Kingdom ...	50,500	+ 4,400
,, Germany	2,500	− 2,200
,, Belgium	10,300	+ 7,000
,, United States ...	1,700	− 700

Nigeria

	1938 £	Inc. or dec. on 1937 £
Radio sets—		
Total	7,500	− 900
From United Kingdom ...	2,700	− 400
,, Holland	3,700	+ 600
Radio parts—		
Total	7,500	− 14,100
From United Kingdom ...	5,600	− 12,700
,, United States ...	1,100	+ 1,100
Other telegraph and telephone apparatus—		
Total*	3,500	− 15,400
Other electrical apparatus—		
Total	87,800	+ 44,900
From United Kingdom ...	69,000	+ 33,000
,, Germany	8,300	+ 4,900
Electrical machinery—		
Total	47,600	+ 7,200

Gold Coast

	1938 £	Inc. or dec. on 1937 £
Radio sets—		
Total	1,800	− 2,400
From United Kingdom ...	1,000	− 700
,, United States ...	300	− 500
,, Germany	300	+ 100
Radio parts—		
Total	13,700	− 600
From United Kingdom ...	13,400	− 100
Other telegraph and telephone apparatus—		
Total	15,500	+ 5,600
From United Kingdom ...	15,000	+ 5,200
Other electrical apparatus—		
Total	124,000	− 20,700
From United Kingdom ...	112,000	+ 2,000
,, Germany	3,700	− 5,800
,, United States ...	5,500	− 3,600
Electrical machinery—		
Total	207,000	+ 39,000

Southern Rhodesia

	1938 £	Inc. or dec. on 1937 £
Electric cable and wire—		
Total*	146,000	+ 12,000
Electric lamps—		
Total*	21,400	+ 4,900
Elec. material not elsewhere enumerated—		
Total	40,500	+ 4,600
From United Kingdom ...	16,500	− 4,800
,, Canada	8,000	+ 2,600
,, United States ...	7,000	+ 3,600
Radio material and apparatus—		
Total	55,000	+ 1,000
From United Kingdom ...	9,100	+ 2,500
,, United States ...	24,100	− 5,200
,, Holland	17,800	+ 1,600
Telegraph and telephone material and instruments—		
Total*	38,000	+ 19,000
Batteries—		
Total	19,600	+ 800
From United Kingdom ...	11,600	+ 200
,, United States ...	4,200	− 900
Motors—		
Total	53,100	+ 4,500
From United Kingdom ...	42,800	+ 800
,, Germany	4,300	+ 2,400
Transformers—		
Total	85,800	− 34,400
From Germany	7,500	− 3,700
Other electrical machinery—		
Total	235,000	+ 106,000
From United Kingdom ...	179,000	+ 70,000
,, United States ...	12,100	+ 4,800
,, Germany	37,500	+ 29,000

Tanganyika

	1938 £	Inc. or dec. on 1937 £
Electric light bulbs—		
Total	2,100	+ 200
From United Kingdom ...	800	− 40
,, Germany	700	+ 90
Insulated wires and cables—		
Total	15,250	+ 10,850
From United Kingdom ...	5,700	+ 1,600
,, Germany	9,200	—
Electric wires and cables, uninsulated—		
Total*	1,100	− 6,500
Telegraph and telephone instruments and apparatus—		
Total*	2,800	− 2,600
Radio apparatus—		
Total	9,300	− 3,200
From United Kingdom ...	2,300	− 1,600
,, United States ...	3,300	− 2,600
,, Germany	1,100	—
,, Holland	2,400	+ 1,100
Electrical goods and apparatus not elsewhere specified—		
Total	19,000	− 2,900
From United Kingdom ...	10,600	− 4,900
,, Germany	6,500	+ 3,300
Electrical machinery and parts—		
Total	39,100	+ 20,000
From United Kingdom ...	17,800	+ 4,000
,, Germany	19,400	+ 15,900

* Mainly from United Kingdom.

COMMERCIAL and INDUSTRIAL NEWS

Electricians' Wages. Gymnasium Lighting Installation. Capital Issues Control. Trolley-buses for Durban. Factory Working Conditions

Wages in the Contracting Industry

WE mentioned last week an impending increase in wages for workers in the electrical contracting industry. Mr. L. C. Penwill, director and secretary of the National Federated Electrical Association, has now sent us details of the agreement reached between the N.F.E.A. and the Electrical Trades Union. The interim (war adjustment) agreement of October 18th providing for an addition of 3s. 6d. per week to wages is to remain in operation up to and including the first pay-day in January for the period covered by that pay-day. Thereafter it will be superseded by the following stabilised rates for the period of the war :—Grade "A," 1s. 9½d. per hour (subject to an addition of 5 per cent., making 1s. 10¼d.); Grade "B," 1s. 7½d. per hour (plus 1d. per hour in lieu of travelling time in the Mersey district); Grade "B.2," 1s. 7d. per hour; Grade "C," 1s. 6¼d. per hour.

As from the second pay-day in January, for the period covered by that pay-day, the wages set out above will be subject to a cost-of-living (war) addition to be declared by a small committee of both sides in December, 1939, and thereafter at three-monthly intervals, which will come into operation on the second pay-day of the month following the declaration for the period covered by that pay-day. The addition will be calculated as follows :—(a) 5d. per week for each point variation in the cost-of-living figure (all items) above that of September 1st, 1939 (155). (b) The rise or fall will be based on the average of the figures published by the Ministry of Labour in the month in which the committee sits and the two preceding months. (c) Fractions of over half a point will count as a point, lower fractions will be ignored.

The payment will apply to all journeymen electricians and assistants over 21 years of age irrespective of the number of hours worked provided that (a) the full weekly addition shall be paid when the period of employment is not less than three days in any one week; and (b) for periods of less than three days payment will be made at the rate of one-sixth of the weekly addition for each day or part of a day, to the nearest penny.

The Joint Industrial Council for the Electrical Cable Making Industry has circulated a copy of the agreement to its members in the Greater London (No. 10) Area as the rates in the contracting industry are applied to plumber jointers and their mates in the area.

Decoration Lighting Sets

At Christmastide home always seems the most natural place to enjoy the festivities. Never were there so many circumstances conducive to staying indoors than this year, and far-seeing traders will naturally take advantage of the opportunity to meet the demand that home parties will bring. Among the electrical equipment falling into this category are "Osram" decoration sets, the range of which has now been extended by the General Electric Co., Ltd., to make it really comprehensive.

In the forefront of the range is the popular "Fairy Light" set, comprising twelve coloured lamps in neat bakelite holders. It is wired with attractively finished well-insulated flex and supplied with an adaptor which enables it to be connected to any ordinary lighting point. The voltage range for which it is suitable is 200/250 V. Boxed in a brightly coloured self-erecting display carton it provides the dealer with a splendid opportunity to make a seasonable show, and its low price should ensure a good demand.

"Osram Party Lights" set

In the next price range there is the "Party Lights" set, with multi-coloured bell-shades, which is now available in two series—the already popular "Nursery Rhyme" set (series A) and a new set (series B) which features the adventures of the giant panda. This is supplied complete with an extension socket which enables it to be connected with another set.

The company has adequate stocks but advises dealers to order early so as to avoid the delay which may be experienced during the peak selling period.

School Gymnasium Lighting

The evacuation of school children has meant that many schools in the reception areas have to serve the needs of many more children than usual. In many cases buildings which previously were hardly ever used after dark are now in great demand and the lighting has to be brought up to date. In a gymnasium the glare of bare lamps must obviously be avoided at all costs, and open type reflectors provide no protection to eyes looking directly upwards. The accompanying picture shows an installation completed recently at Culford School, Suffolk, using Benjamin "Glassteel" diffusers with 500-W lamps. These particular units are well suited for this purpose since the glass globe surrounding the lamp limits the brightness which might otherwise be dangerous and at the same time distributes the light where it is wanted. The installation was carried out by the East Anglian Electric Supply Co., Ltd.

Benjamin reflectors are used for lighting this school gymnasium

Scottish Electricians' Wages

An interim wartime bonus of 1d. per hour to meet the increased cost of living is to be paid to approximately 3,500 Scottish electricians. The increase commenced to operate on November 27th and remains in force until a permanent sliding scale is agreed to between the Electrical Contractors' Association of Scotland and the Electrical Trades Union. A joint committee has been appointed for the purpose of arranging a mutually satisfactory sliding scale. The new standard rate as from November 27th will be 1s. 8d. per hour. This increase in journeymen's wages, besides affecting the electrical contracting industry, will apply also to electricians employed on maintenance in factories and workshops, and a number of men employed by local authorities.

The Norwich Appointment

When the vacant position of city electrical engineer of Norwich was advertised a few weeks ago the Associated Municipal Electrical Engineers and the E.P.E.A. requested their members not to apply as the salary offered (£1,500 rising by two annual increments to £1,700) was not in accordance with the scale. They stated that the commencing salary should be £1,700. A meeting of the Electricity Committee was held last week when applicants for the position were interviewed, but, it is reported, no appointment was made.

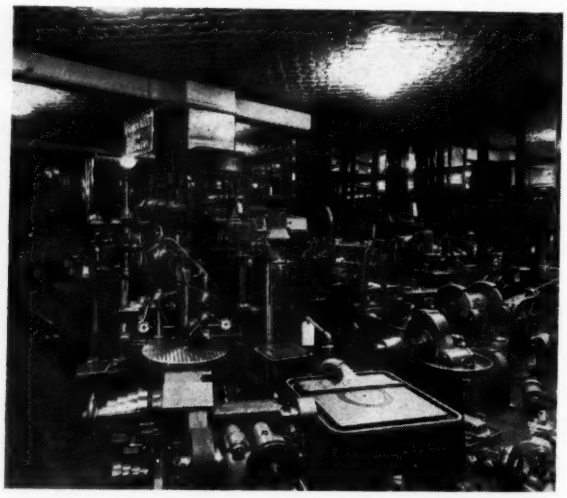
E.I.B.A. Christmas Collections

Each year quite a number of Christmas collections are made among the staffs of electrical firms and supply companies and authorities in aid of the Electrical Industries Benevolent Association. The first collection to come in this year (a sum of £6 11s. 9d.) was received as early as the end of November from Mr. A. C. Johnson, borough electrical engineer of Southend-on-Sea and his staff. Now that special efforts are needed on the part of everybody in the industry if their Benevolent Asso-

ciation is to be provided with the funds to carry on its increasing work, it would be particularly appropriate if all offices were to make some similar gesture as an extra bit of help.

Machine Tool Showroom Lighting

A lighting installation by the British Thomson-Houston Co., Ltd., at the machine tool showroom of Messrs. F. J. Edwards, in Euston Road, London, illustrates the value of mercury vapour electric-discharge lamps for the illumination of machine shops. On account of the high reflectivity of polished metal surfaces, the lighting of machine shops is always a problem demanding special attention in order to avoid glare and hard shadows. The installation referred to comprises fifteen 80-W



The machine tool showroom of Messrs. F. J. Edwards illuminated by "Mercra" Lamps.

and six 125-W "Mercra" lamps with their associated B.T.H. chokes and condensers. The resultant illumination is remarkably high and the total load is only 1.95 kW. To provide an equivalent intensity with tungsten filament gasfilled lamps the consumption would need to be three times as great. An intensity of 20 ft.-candles is given, which is found perfectly satisfactory, and the accompanying illustration shows clearly the excellent diffusion of the lighting and the absence of hard shadows, while the detail of each machine is brought out effectively.

Modern China

The mention of China usually conjures up visions of pagodas, temples, idols and other mysteries of the Orient, but the accompanying illustration shows how the country is changing. The picture illustrates the Eu Buildings in Hong Kong, which are owned by Mr. Eu Tong Sen, a local Chinese resident. Designed by Palmer & Turner, the buildings are of extremely modern design, and are equipped throughout with "Creda" 12-gall. water heaters (Simplex Electric Co., Ld.,), which were supplied through Shewan, Tones & Co., of Hong Kong. Although China is regarded by many as a "backward" country, buildings of this kind equipped with electric water heaters and similar appliances demonstrate the progressive policy of the Far East.

Employment in October

There was little change in the number of unemployed in the engineering industry at October 16th and the percentage out of work was the same as for the preceding month (3.8 per cent.). According to the *Ministry of Labour Gazette* the number of unemployed in the electrical engineering industry was 3,316, or 2.8 per cent., an increase as compared with September of 9.3 per cent. In the electrical wiring and contracting industry the number out of work (3,495) also showed an increase from 6.8 to 8.2 per cent., while in the electric cable, apparatus, lamps, etc., group the number unemployed was 9,046, the percentage rising by 0.9 to 5.2.

Control of Capital Issues

Restrictions upon the raising of new capital were imposed on the outbreak of war making it illegal "to make an issue of capital in the United Kingdom, to make, in the United Kingdom, any public offer of securities for sale, or to renew or postpone the date of maturity of any security maturing for repayment in the United Kingdom," except with the consent of the Treasury. A new Order has now been made superseding the original one. This, the Defence (Finance) Regulations Amendment (No. 2) Order, 1939, includes in the definition of "securities" mortgages and charges and any increases of the amount secured by these. The Capital Issues Exemptions (No. 3) Order, 1939, however, exempts from the provisions of the principal Order transactions in which the value of the consideration involved, together with the value of the consideration involved in any previous transactions of the same kind during the preceding twelve months by the same person or in the period beginning on September 3rd, 1939, whichever is the shorter period, does not exceed £10,000. Various other financial transactions which do not involve the raising of new capital, *e.g.*, the allotment of fully paid shares by a private company to the vendors of an undertaking, are exempted from the operation of the principal Order.

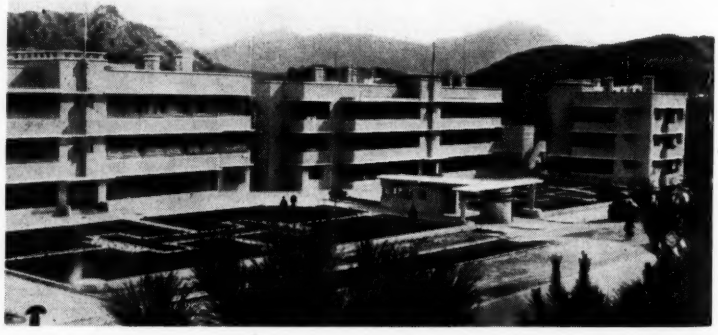
Road Sign Exhibition

Not being able this year to make known its products at the Public Works Exhibition, Gowshall, Ltd., is now, until the end of next week, holding a private display at its premises at 14-15 Lamb's Conduit Passage, Red Lion Square, London, W.C.1. Comprising all forms of illuminated road traffic signs, bollards, &c., specially adapted to meet the black-out restrictions, the exhibits are of particular interest at the present moment to all concerned with safety on the road.

Perhaps the most striking feature of the display is the use made of 0.5-W neon lamps. Two of these have actually been found sufficient to illuminate a regulation "Keep Left" sign or an advance direction sign measuring 5 ft. by 3 ft. As an alternative, the units can be fitted with 15-W black-sprayed lamps, which is in fact the highest wattage lamp used in any of the signs. The "Mandalite" fitting has been specially designed to illuminate any of the ordinary mandatory signs such as "No Entry" or "Turn Left," while a new electric road lamp, having the 4-in. specified diagonal white cross and illuminated by a 15-W black-sprayed bulb, has considerable advantages over oil units, especially with regard to maintenance costs; it can, however, in the event of a failure of the electricity supply, be quickly converted to oil by slipping in a 60-hour oil burner. All the company's bollards are now being finished in white. In all the units shown great care has been taken to secure even illumination and every one is made so that it can be used with normal lights when the war is over.

French Contractors' Wartime Scheme

Plans for the organisation of the Syndicat Général des Installateurs Electriciens Français for the duration of the war have now been put into operation in France. The object is to keep the industry going and to help both workers and contractors. The main points are the creation of a mutual aid fund and a system permitting one-man businesses to be kept open, even when the owner is mobilised. The mutual aid found financed by *pro rata* contributions from both electrical workers and electrical contractors, is intended to provide comforts for electricians at the front, and to help their families over any financial difficulties which may arise. A Commission composed of contractors has been formed to carry on small contracting firms whose owners have been mobilised, and which would normally have to be closed on account of the war. The purpose of this plan is, first, to avoid unnecessary unemployment and, secondly, to keep contractors from losing their clientele.



A modern building in Hong Kong equipped with "Creda" water heaters

In addition to this system of professional mutual aid, the Syndicate has provided a further service, which has been placed at the disposal of the authorities for the duration of the war. This is an office at which a staff of qualified electricians with suitable quantities of material is constantly on hand to carry out any urgent repair or installation work. Intended particularly to provide a staff of men able to repair the effects of possible bombardments, this service is also able to do any particularly urgent work required by the authorities. The office is also able to call up additional workmen if they are needed.

Electrical Commercial Travellers

The annual general meeting of the Electrical Trades Commercial Travellers' Association was held on November 10th, when Mr. T. W. Heather, a director of the General Electric

Co., Ltd., was elected president, and Mr. P. E. Wheatland was elected chairman. Mr. S. Johnson is the Association's secretary and Mr. D. J. Hughan is the treasurer.

The secretary is anxious to compile a register of all members of the Association who are serving in H.M. Forces, and any information which will help him will be appreciated. He would also like to know if any members are experiencing difficulty with their cars as a result of the petrol rationing scheme. If it is found that generally there is any real hardship the advisability of making official representations on behalf of the Electrical Trades Commercial Travellers will be considered. All communications should be addressed to him at 78, The Ridgeway, Waddon, Surrey.

Make Sure of Your Copy

Although we have said it before, some readers may not have seen it or have failed to act. We refer to our advice that they should ask their newsagent or bookstall to let them have a copy of the REVIEW regularly. By this means readers can assist in conserving paper by enabling us to gauge more closely the number of copies which will be required each week and so avoid waste.

Short Time at Eccles

Protest meeting of employees of the mains department of the Eccles Corporation Electricity Department was held last Friday, following a decision of the Council that nineteen men should be put on short time working, losing one week's work in five. The Council has also decided that ten men engaged in the public lighting department should be stood off one week in four.

Copper Machining

"The Machining of Copper and its Alloys," a book of 108 pages containing 44 illustrations, is No. 34 of the useful series issued free of charge by the Copper Development Association, Thames House, Millbank, S.W.1. It is intended as a practical handbook of machining practice, which has been profoundly modified during the past few years as a result of the introduction of high-strength copper alloys and also of the development of improved cutting-tool materials such as tungsten carbide, the possibilities of which in relation to copper have not yet, it is stated, been fully explored. The book should also prove a reliable guide in the selection and inspection of materials for machined copper products.

Suspension of Annual Contracts

Present-day difficulties in the purchasing of supplies by annual contract were the subject of a report by the city electrical engineer of Liverpool which was considered at the December meeting of the City Council. The engineer stated that forty-two firms had notified increases in prices ranging from 1½ to 60 per cent. It was decided that the issue of tender forms for the supply of materials normally purchased under the terms of an annual contract should be suspended for 1940-41, purchases being made in the open market.

International Electrotechnical Commission

In present circumstances the work of many international organisations has necessarily been curtailed or even suspended. It is, therefore, of interest to learn that during the war it is proposed to maintain the Central Office of the International Electrotechnical Commission in London. It will probably not be possible for meetings of the Technical Advisory Committees to be held during the war, but as much as possible will be done by correspondence with a view to bringing to a conclusion all work which was nearing completion at the outbreak of hostilities. It is felt that the National Committees may like to have the benefit of the work already accomplished, and as many as possible of the draft specifications which have been under consideration during the last year or two will, it is hoped, be issued as provisional I.E.C. recommendations. In the meantime, copies of all existing I.E.C. publications are still obtainable from the general secretary of the I.E.C., 28, Victoria Street, London, S.W.1.

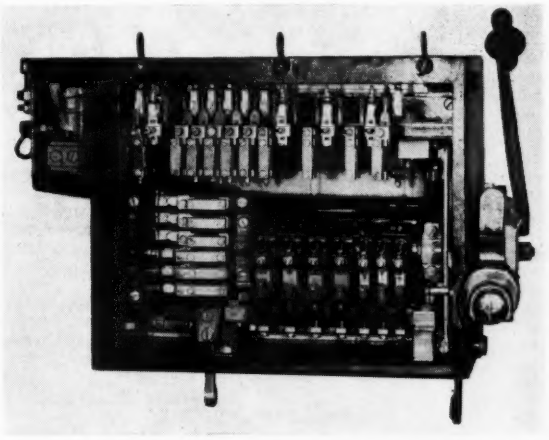
Trolley-buses for Durban

Durban Corporation recently placed a contract in this country for eleven six-wheel double-deck trolley-buses. The electrical equipment by the Metropolitan-Vickers Co., will be fitted to Leyland chassis having Metropolitan-Cammell Weymann bodies. The laden weight of each vehicle, with seventy passengers, will be approximately 14½ tons.

The scheme of control is a modified form of the Met.-Vick. rheostatic brake system, which in its standard arrangement entails the use of a compound-wound motor, the full field characteristic of which prevents regeneration within the range of service speed of the vehicle. Rheostatic braking is obtained by excitation of the shunt winding only. It is so connected to the line supply in series with a portion of the main braking resistance that it provides a stabilising effect, resulting in the maximum braking torque being positively limited and maintained at a high value down to a low speed. The modification required by the customer's specification entailed the provision of 20-A of regenerating current at balancing speed.

Some severe gradients have necessitated the fitting of runback and coasting brakes as originally developed by the Met.-Vick. Co. The coasting brake is obtained by placing the reverse lever of the master controller in the appropriate position, which limits the speed positively to a predetermined value down a given gradient. Apart from steering no further action by the driver is required, and the effectiveness of the brake is independent of the line supply. The runback brake which is automatically applied should the vehicle tend to run backwards downhill when the reverser is in the forward position, positively limits the runback speed to 2 MPH.

The main motor with half-coupling weighs 1,300 lb. and has a one hour rating of 105 HP at 550 V, to B.S.S. 173—1928. It is of the "206" type with taper slot winding but incorporates a fan to give increased capacity. A 1.6-kW, 1,250-



Cab-mounted main switch-group showing main and shunt contactors, fitted with front connections

RPM generator is overhung at the commutator end of the motor, the main switch-group is cab-mounted, and the contactors of pure silver are of the electro-magnetic type throughout. Main contactors are of the unit pattern and are removable from the front of the panel, on which all contactor connections are made. The master controller of the scissors type embodies in this instance the accelerating and rheostatic brake controllers and the coasting brake switch as well as the reverser. Protection against interference with wireless reception is given by circuit filters and condensers.

Part-time A.R.P. Workers

The position of part-time members of the Civil Defence Service who might be summoned to undertake civil defence duties during their normal hours of employment is a matter that has been causing a good deal of perplexity. A circular on the subject issued this week by the Minister of Home Security to local authorities is therefore welcome. It is pointed out that if a proper state of preparedness against air raids is to be ensured a reduction in the present costs of maintaining whole-time paid personnel depends largely upon local authorities being able to count upon the availability of unpaid personnel. At the same time it is essential that production and business should not be interfered with unnecessarily. It has therefore been the policy that unpaid volunteers who are at their work when a summons to civil defence duties is received from the local authority should not leave their employment unless under an arrangement previously made with the consent of their employers. It is important that local authorities, if they have not already done so, should decide what part-time volunteers they would have to summon, and the volunteers so required should ascertain that their employers would consent to their release. If a part-time unpaid volunteer is either already on duty when the air-raid warning is sounded or is summoned for such duty, he should complete his duty before returning to his employment. Although unpaid part-time volunteers will not in all cases lose wages as the result of absence from employment upon civil defence duties, local authorities are authorised to compensate volunteers for any loss of remunerative time actually incurred, up to a maximum of 10s. a day for men and 7s. for women.

In a number of areas voluntary arrangements are being made between the local authority and industrial and commercial establishments in the area who, under the Civil Defence Act, have trained and equipped some of their workpeople in anti-gas, first-aid and fire-fighting measures, by which the local authority can call upon these parties and squads for assistance. Such co-operation between these establishments and the local authority is of the greatest value, and Sir John Anderson hopes it will be rapidly extended. Local authorities will appreciate that employers should not be asked to detach these parties automatically upon an air-raid warning.

Working Conditions in Factories

Between 1915 and 1917 the Health of Munition Workers Committee investigated the effects of hours of work upon output, accident incidence, sickness absence and lost time in munitions factories and it was shown conclusively that overlong working hours might be not only harmful but uneconomical. In 1918 the work of the Committee was carried on by the Industrial Fatigue Research Board which later became the Industrial Health Research Board, whose nineteenth

annual report, for the year ended June 30th last, has just been issued (H.M. Stationery Office, price 6d.). During 1938-39 the Board's investigations into environmental conditions included the relation of lighting and vision. Research on the effect of variations of brightness contrast on the illumination required for simple visual tasks involving the discrimination of fine detail was carried a stage further, and a report is expected to be issued shortly. A special report dealing with industrial lighting in relation to the health and efficiency of the worker is being prepared by Mr. H. C. Weston.

Reserved Occupations

A new list of changes in the Schedule of Reserved Occupations issued by the Ministry of Labour and National Services shows that many reservation ages have been reduced. Included in these are telegraphists (other than Post Office), whose reserved age has been reduced from 30 to 25. The reservation age of Post Office telegraphists has been raised from 21 to 25.

D.O.T. Change of Address

The Department of Overseas Trade has now removed from 35, Old Queen Street, London, S.W.1, to New Public Offices, Great George Street, S.W.1. The telephone number will remain Whitehall 9040.

G.E.C. Lighting Developments

Details of a number of lighting developments, including the introduction of a range of public A.R.P. illuminated signs, are included in the November issue of the *Osram Bulletin*. There are also articles on "Shop and store lighting in wartime" and "The lighting of a modern factory."

Trade Announcement

The Manchester branch of the London Electric Wire Co. and Smiths, Ltd., Frederick Smith & Co., and the Liverpool Electric Cable Co., Ltd., has been removed to 4, Chatham Street, Manchester, 1.

New premises for the sale of electrical goods have been opened by James McKenzie, Ltd., electrical engineers, of Birkenhead, at 98, Market Street, Hoylake.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, ETC.	Price December 6th	Fortnight's inc. or dec.
a Acid oxalic ... ... per cwt.	Suspended	—
a Ammoniac, Sal ... ... per ton		—
a Ammonia, Muriate (large crystal)... ,,		—
a Borax... ... ... ,,		—
a Copper, Sulphate ... ... ,,		—
a Potash Chlorate ... ... per lb.		—
a ,, Perchlorate ... ... ,,		—
a Shellac ... ... per cwt.		—
a Sulphur, Commercial ... ... per ton		—
a ,, Roll ... ... ,,		—
a Soda, Chlorate ... ... per lb.		—
a ,, Crystals ... ... per ton		—
a Sodium, Bichromate, casks ... per lb.		—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£94	—
b ,, Wire ... ... per lb.	1/3 to 1/9	—
b ,, Sheet and Foil ... ,,	1/4 to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£197	—
Grade II ... ... ,,	£137	—
Grade III ... ... ,,	£73	—
c Brass (rolled metal 2" to 12" basis)... per lb.	8¾d.	—
c ,, Tubes (solid drawn) ... ... ,,	1/0½ to 1/0½	—
c ,, Wire, basis ... ... ,,	9½d.	—
c Copper Tubes (solid drawn) ... ,,	1/1½d.	—
g ,, Bars (best selected) ... per ton	£85	—
g ,, Sheet... ... ... ,,		
g ,, Rod ... ... ,,		
d ,, (Electrolytic) Bars ... ... ,,	£51	—
d ,, ,, Wire Rods ... ,,	£55	—
d ,, ,, H.C. Wire ... per lb.	8¾d.	—
f Ebonite Rod ¼" dia. & up ... ... ,,	1/10 to 2/3 + 10%	—
f ,, Sheet ⅛" thick & up ... ,,	1/4 to 1/8 adv.	—
n German Silver Wire, Nos. 1 to 12... ,,	2/5	—
h Gutta-percha, fine ... ... ,,	Nom.	—
h India-rubber, Parafine ... ... ,,	1/–	½d. inc.
g Lead, English Pig ... ... ,,	Nom.	—
g Mercury ... ... per bot.	Nom.	—
e Mica (in original cases) small ... per lb.	1/3 to 3/–	—
e ,, ,, ,, medium ... ,,	9/– to 18/–	—
e ,, ,, ,, large ... ,,	20/– to 27/6	—
p Phosphor Bronze, plain castings ... ,,	1/2½	—
p ,, ,, drawn bars & rods ,,	1/2	—
p ,, ,, rolled strip & sheet ,,	1/–	—
p ,, ,, wire ... ... ,,	1/2	—
o Platinum ... ... per oz.	£10	—
d Silicium Bronze Wire ... ... per lb.	8½d.	—
g Spelter ... ... per ton	£15	—
g Tin, Block (English) ... ... ,,	£230	—
n ,, Wire, Nos. 1 to 16 ... ... per lb.	4/3	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in this section under the same heading.

Supervising Engineers' Salaries

The Executive Council of the Association of Supervising Electrical Engineers has had under consideration the position of its members in view of the rising cost of living and the extra burden of duty thrown upon them by the war. As a result of these deliberations a letter has been prepared and circulated to employers setting out the circumstances and suggesting that an increase of 15 per cent. in supervising electrical engineers' salaries is justified although this will not meet the extra costs in which they are involved. The hope is expressed that the proposal will receive favourable consideration, and employers are invited to consult with the Association on the matter.

Redesigned Plant

J. Gerber & Co., Ltd., who specialise in the redesigning of second-hand material to suit the specific wishes of their customers, have recently completed two interesting generating sets. One of these is a 700-HP DC motor direct-coupled to a 430-kVA, 420-V, 3-phase, 50-cycle alternator at 750 RPM, and represents the second order from this particular customer, a similar set of 900 kVA being supplied two months ago.

The other set is a 65-HP Diesel engine, direct-coupled to one of the company's redesigned 40-kVA alternators. A special fabricated bedplate has been designed to take the combined unit. The company has other sets at present under construction, including a 90-HP petrol generating set and an experimental engine on its test bed which it has converted from petrol to paraffin. The latter engine was originally designed for tractor purposes, and has been redesigned for stationary use. The company has several motor generating sets and a number of redesigned alternators which have been converted from second-hand DC motors, and it has supplied over fifty of these converted units during the current year.

Telephone Numbers Changed

Rival Lamps, Ltd., whose advertisement appears on page iii of this week's cover, tell us that their telephone numbers have been changed to Gipsy Hill 4226/7.

Change of Address

Turners Asbestos Cement Co. announces that its London office has now been removed from the temporary address at Broxbourne, occupied at the outbreak of hostilities. The address is now Turners Asbestos Cement Co. (Branch of Turner & Newall, Ltd.), Sales Office, Erith, Kent (telephone: Erith 2201).

New Catalogues and Lists

Evershed & Vignoles, Ltd., Acton Lane Works, Chiswick, London, W.4.—Publication (No. 202), "a pocket book on earth testing," refers to the "Megger" earth tester, and explains the nature and characteristics of an earth resistance and the method of measuring the resistance to earth of earth electrodes. Publication No. 204 describes the Evershed-Midworth distant repeater for transmitting information to a distance and for controlling distant apparatus. Applications mentioned include schemes for the indication in pumping stations of the water level in distant reservoirs, automatic control of pumping stations, the supervisory control of electric sub-stations, and the distant indication of gas and water flow.

Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2.—A folder describing a new illuminated regulation sign for shops, &c.

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, Kingsway, London, W.C.2. A leaflet suggesting suitable electrical appliances for Christmas presents.

Belling & Co., Ltd., Bridge Works, Southbury Road, Enfield, Middlesex.—Leaflets describing the "Dandie" economy model fire and the "Champion" heater for A.R.P. shelters.

London Electric Firm, Brighton Road, South Croydon.—A brochure illustrating the many types of searchlights manufactured by the company.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Catalogue section F(4) containing 80 pages dealing with industrial lighting fittings and accessories. Also leaflet No. 8925 on switchgear for lighting services in air-raid shelters.

Ward & Goldstone, Ltd., Frederick Road, Pendleton, Manchester.—The 1940 catalogue (BH1039) of "Goldtone" installation accessories, lighting fittings, &c.

National Lighting Co., Ltd., 19, Bride Street, London, E.C.4.—A supplementary list of electrical fittings and lampshades, including special types for A.R.P. purposes.

Information Department

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

WONDERLITE billiard shade.

CYC-ARC welding system (present address of makers).

ELECTRICITY SUPPLY

Reintroduction of Hire-purchase at Cheltenham. Enfield Favours Electricity for Wardens' Posts. Proposal to Appoint a Borough Electrical Engineer at Neath

Barnstaple.—INQUIRY INTO EXTENSION SCHEME.—An inquiry is to be held on December 14th into the application of the Town Council for permission to extend the generating station.

Bridlington.—DISCOUNT WITHDRAWN.—The 5 per cent. discount allowed by the Town Council's electricity undertaking for prompt payment is to be discontinued as from the present quarter's meter readings.

Burnley.—HIGHER CHARGES.—An increase of 12 per cent. in the ordinary lighting rate is recommended by the Electricity Committee. The running charge under the "all-in" rateable value system will not be advanced, but these consumers will pay 5 per cent. extra on the standing charge. Increases are recommended for industrial power and prepayment meter supplies. The price for domestic heating will not be changed, and business premises will be brought into line with private dwellings for heating and domestic purposes.

Cheltenham.—HIRE-PURCHASE FACILITY RESTORED.—At the outbreak of war the Electricity Department's hire-purchase scheme was suspended, but the electrical engineer recently recommended that the system should be restored for application to suitable cases. The renewal of the scheme for a period of six months was authorised by the Electricity Committee, the electrical engineer to satisfy himself in each instance that the applicant was reasonably likely to fulfil his obligations.

SUPPLY TO GASWORKS.—The gas company is to take electricity supply for its works in Lower Mill Street, and the Electricity Committee has agreed to extend the mains for the purpose at a cost of £180.

Edinburgh. — PROPOSED SUBSTATION.—At Edinburgh Dean of Guild Court on December 1st, British Oil & Cake Mills, Ltd., was granted permission to erect a sub-station at Salamander Street, Leith.

Enfield.—OIL LAMPS "UNSATISFACTORY."—By a decision of the Middlesex County Council's Civil Defence Committee it is proposed to use oil lamps for the lighting and heating of wardens' posts. Recently one of the lamps was tried at Enfield, and in a report to the U.D.C. the chief warden stated that from a heating point of view it was definitely unsatisfactory. As a result, the U.D.C. is to make another attempt to secure the approval of the County Council to a scheme for providing electric lighting and heating in wardens' posts in Enfield, of which there are nearly seventy.

Erith.—TARIFF CHANGES.—After the December meter readings the lighting flat rate is to be raised from 3d. to 4½d. per kWh, but against this the meter rents payable by quarterly consumers are to be abolished. The heating and cooking rate is to be increased from ¾d. to ⅝d. Slight increases will apply to the standing charge of the two-part tariff, but the "unit" charge remains at ½d. For the "all-in" tariff the price per kWh will be 1¼d., reducing to ¾d. for consumption in excess of 1,800 kWh per annum. Adjustments are also being made in the prices charged to large manufacturers.

Glasgow.—ELECTRIC HOSPITAL HEATING.—A decision that the heating of the reception house and sanatorium blocks at Woodilee Mental Hospital should be all-electric was reached at a recent meeting of the City Health Committee. The system adopted comprises electrode steam boilers, electrode water heaters and immersion heater units for domestic supply, and that the tender of James Combe & Son, Ltd., amounting to £10,629, is recommended for acceptance. Additional expenditure estimated to amount to £4,400 will be incurred on the provision of main cables and switchgear in the main switchroom and sub-station at the institution. The medical officer is to discuss with the Clyde Valley Electrical Power Co. the terms for a supply of electricity for heating.

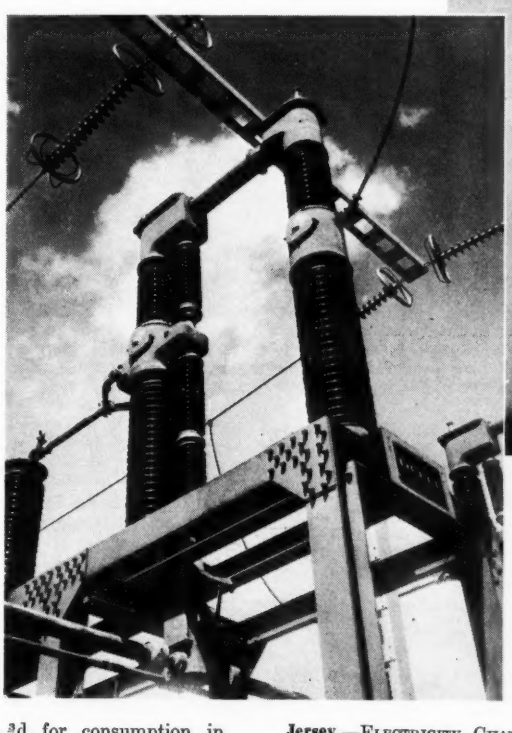
LIGHTING CONTROL.—The Sub-committee on Fire Brigade and Lighting recommends the erection of a new lighting control station at Govan. The estimated cost is £29,000.

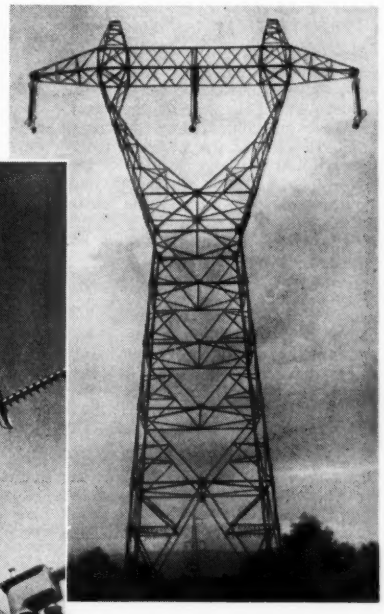
Hailsham.—SEWAGE WORKS CHANGE-OVER.—The R.D.C. proposes to convert the Polegate sewage works from oil-engine to electric drive, and has arranged for the Eastbourne Corporation to provide an electricity supply at a cost of £261.

Heston and Isleworth.—NO PRICE INCREASE.—The Electricity Department announces that it does not at present propose to increase its charges and hopes that this information will bring some small ray of light into homes already darkened by the gloom of ever-rising prices.

Houghton-le-Spring. — STREET LIGHTING PAYMENTS. — The Urban District Council has decided to refer to the Durham County Branch of the Urban District Councils' Association the question of street lighting payments to gas and electricity supply authorities during the "black-out." It was reported at a meeting of the Council that a protest had been made to the North-Eastern Electric Supply Co., Ltd., against the clause in the lighting agreement that payments amounting to 50 per cent. of the usual charge should be made to the company during the black-out. The Council contended that this clause related only to a short time and not to a prolonged period of non-lighting.

The legal adviser of the Urban District Councils' Association has informed the Council that it is legally bound to pay the amount under the agreement, but that the Council has a strong case on merits for a larger proportion of abatement.





Taken during the I.E.E. Students' Section visit to France last summer, these photographs illustrate a type of transmission tower used in parts of France (pulley blocks are suspended from the cross-arms in readiness for hoisting the line) and 220-kV switchgear at the Henri-Paul sub-station

Jersey.—ELECTRICITY CHARGES.—The Jersey Electricity Co., Ltd., states that it has six months' supply of fuel oil for its Diesel generating plant and is still receiving normal supplies. Consequently there appears no reason for electricity to be rationed. The black-out has caused a very serious drop in output, and this will automatically increase generating costs. Moreover, the cost of fuel and of practically everything else used is progressively increasing, but with the stocks which it holds the company will make every effort to carry on without increasing the price of electricity, at any rate until next March. Should the war be prolonged, increases will no doubt have to be made, but the more consumers help by using electricity freely, the longer it will be possible to postpone increasing the rates.

Lancaster.—M.D. CONCESSION FOR CINEMAS.—Union Cinemas, Ltd., recently sent a letter to the Electricity Committee asking for a concession with regard to maximum demand, owing to the fact that all cinemas were compulsorily closed by the Government between September 3rd and 8th. The Committee decided to grant the request. All other cinemas in the city will be similarly treated.

Liverpool.—LOAN APPLICATIONS.—The Electric Power and Lighting Committee recommended the City Council on Decem-

ber 6th to make application to the Commissioners for sanction to borrow £38,080 for the provision of generating plant at the Clarence Dock power station, and £6,000 for sub-station buildings.

London.—FULHAM.—It is reported that the Council does not at present propose to increase the electricity charges.

Macclesfield.—PURCHASE OF UNDERTAKING.—The Corporation has completed the purchase of the undertaking of the Electricity Co. of Macclesfield, Ltd., at a price understood to be £690,000.

Manchester.—LOAN FOR SUB-STATION EXTENSION.—The Electricity Committee has obtained sanction to borrow £20,450 for the extension of Greenwood Street sub-station.

Morecambe.—HIRE-PURCHASE ARRANGEMENTS.—Continuation of the hire-purchase scheme for the time being at existing prices, but at higher rates when prices increase, is recommended by the Electricity Committee.

Neath.—PROPOSED TO APPOINT ELECTRICAL ENGINEER.—The Town Council has decided to appoint a borough electrical engineer in spite of strong opposition from a section of the Council. Coun. P. Howell, leading the protests, said that the Borough Engineer's Department had carried out the work successfully in the past and an appointment would mean setting up an entire department, which would include a salary of about £500 for the electrical engineer alone. The department, he said, would grow like a snowball. (The Corporation owns the local electricity undertaking whose area of 4,500 acres includes Neath, Melyncrythan and Briton Ferry, with a population of approximately 33,300. In 1937-38 sales amounted to 2.0 million kWh to 3,085 consumers.)

Newcastle-under-Lyme.—CONSUMERS' CO-OPERATION SOUGHT.—Consumers are being invited to assist the Electricity Department to keep down the maximum demand during December, January and February at peak-load periods, *viz.*, 7.30 a.m. to 9.0 a.m. on cold, frosty mornings and between 3.30 p.m. and 5.30 p.m. in the afternoon on week-days and from 11.30 a.m. to 1.30 p.m. on Sundays. If consumers co-operate with the Department to any appreciable extent and use their radiators as little as possible during cold spells between the hours mentioned, particularly in the case of radiators not used under normal conditions, then Mr. DeRenzi, the electrical engineer, thinks it may be possible to review the position at the end of February and suspend the putting into operation of provisional increases which he recommends, until after March quarter's meter readings. He would advise the adoption of this course if any probable loss on the year's working could be kept within reasonable limits, and if this is found practicable it would be almost entirely due to the very wise policy which had been adopted in recent years, of putting a substantial sum each year to reserve from the profits of the undertaking.

Oxford.—REASONABLE DEVELOPMENT TO BE PERMITTED.—Outlining its policy at a meeting of the City Council on Monday the Electricity Committee stated that it would endeavour to keep charges at their present level and proposed to allow reasonable development of the undertaking consistent with war needs.

Rhyl.—SUPPLY IMPROVEMENT SCHEME.—Consent has been received from the Electricity Commissioners for the Council to proceed with its electricity supply improvement scheme (including change-over) which is estimated to cost £18,544.

Scunthorpe.—TWO-PART TARIFF AGREEMENT CONCESSION.—The Electricity Committee recommends that consumers who have vacated their houses because of war service should be allowed to return to the flat rate system without the usual notice.

BULK SUPPLY.—Subject to the Central Electricity Board's approval a new bulk supply agreement with the Appleby-Frodingham Steel Co. is to operate as from January 1st.

Sheffield.—DISTRIBUTION WORKS.—Sites in Ellesmere Road and Meadow Hall Road have been purchased by the Electricity Committee for sub-stations. The Committee also proposes to extend the mains at a cost of £8,306.

Stone.—PRICE INCREASE.—An increase of 12½ per cent. in the price of electricity was announced at a meeting of the Urban District Council last week. The increase will date from January 1st.

Stoke-on-Trent.—STREET LIGHTING CHARGES.—The electrical engineer recently reported to the Electricity Committee that the Newcastle-under-Lyme authorities had raised questions in connection with charges to be made for street lighting during the war. It was decided that where lamps and columns were supplied by the highways authority one-third of the normal rates should be charged, and that where lamps and columns were supplied by the Electricity Department the charges should be at half normal rates.

DISTRIBUTION SCHEMES.—A new sub-station is to be provided at Meir at an estimated cost of £3,250 in connection with the provision of a supply to a new secondary school and for surrounding building development. A site for a sub-station has also been obtained on the Chell housing estate. The Electricity Committee has agreed with the L.M.S. for the provision of supply to a pumping station at Milton at a cost of £500, and is to give an additional power supply to Ramsden & Co., Ltd., Fenton, at a cost of £400. Application is being made for permission to borrow £50,000 for mains and services.

Walthamstow.—SUB-STATION CONSTRUCTION.—The Borough Council proposes to erect a sub-station in Clifford Road.

West Bromwich.—M.D. INDICATORS.—The Electricity Committee proposes to purchase 1,200 maximum demand indicators at an estimated cost of £1,800.

Overseas

Canada.—OUTPUT IN QUEBEC.—The Regional Electricity Board reports that the amount of electricity generated by the 29 principal distributors in Quebec Province during the first half of this year was 7,311 million kWh compared with 6,592 million kWh in the corresponding period of last year, equivalent to an increase of nearly 11 per cent.

New Zealand.—DEVELOPMENT IN WELLINGTON.—In the New Zealand capital there was a substantial increase in electricity consumption during the year ended March 31st last. In his annual report Mr. M. Cable, general manager, reveals that the City Electricity Department sold 95.3 million kWh, an increase of 13 per cent. over the previous year's sales, to its 39,507 consumers, of whom 28,707 were domestic. For different classes of supply the average price charged per kWh ranged from 0.55d. for heating and 0.65d. for the tramways to 2.56d. for private lighting, with an overall average of 0.96d. Total revenue was £383,560 (against £375,286) and working expenses £267,862 (£255,851), the net credit balance being £14,364 (£14,365).

United States.—PLANT CAPACITY.—The installed capacity of all electric generating plants of which details are reported to the Federal Power Commission was 40,204,000 kW at September 30th, states *Reuter's Trade Service*. This represents an increase of 1,162,000 kW, or 3 per cent., since the beginning of the year. Hydro-electric plants had a capacity of 11,354,000 kW, a net increase of 287,862 kW. The chief hydro-electric installations this year have been a privately owned 75,000-kW plant in Virginia and two additional units at Boulder Dam, which increased the station's capacity by 165,000 kW. Privately owned power stations had 8,900,000 kW of hydro-electric generating equipment, or 79 per cent. of the total. The installed capacity of privately owned steam and internal-combustion plants totalled 25,500,000 kW, or 88 per cent. of the total.

TRACTION

Australia.—CONVERSION OF CABLE TRAMWAYS.—At the end of June last there remained eight route miles of cable tramway operated by the Melbourne and Metropolitan Tramways Board which on its inception took over forty-six route miles. Only the Clifton Hill and Nicholson Street cable tramways are still in use, and a scheme is now in hand for the substitution of motor-buses on these routes next March. Revenue from the cable tramways in 1938-39 amounted to £212,189. The Board operates 125 route miles of electric tramways which produced a total revenue of £1,979,556, carrying 161.3 million passengers. The average tram speed was 11.6 m.p.h. Electricity cost 0.712d. per kWh, and 2.875 kWh was used per tram-mile. Buses served forty-nine route miles and provided a total revenue of £128,481. The general manager of the Board is Mr. S. M. Richardson.

Bolton.—TRAMS RETURN.—Trams are to be reintroduced on the Halliwell route in place of buses due to wartime conditions.

Bristol.—VALUE OF TRAM RAILS.—The disposal of the 5,000 tons of disused tram rails which remain in the streets was recently discussed by the Planning and Public Works Committee. The chairman suggested that a considerable sum could be realised by recovering and selling the metal now, and it was decided that the city engineer should investigate the matter.

London.—MORE TRAMS WITHDRAWN.—Apart from the services through the Kingsway tunnel there are now no tram routes in North London, the last service (Highgate Village to Moorgate) having been replaced by trolley-buses last Sunday.

Northern Ireland.—LARGE TROLLEY-BUS DEPOT.—In August it was reported that the Belfast Transport Committee proposed to erect a two-storey trolley-bus depôt, with an open-air parking place on the roof, on the site of May's Markets. At its last meeting the Committee considered a report and plans by the architects, and it was decided to discuss the scheme with the Markets Committee.

Oldham.—RETENTION OF TRAM ROUTE.—It was proposed that buses should take the place of trams on the Hollingwood to Waterhead route, but the Traffic Commissioner for the district has intervened to prevent the conversion. According to the *Passenger Transport Journal*, the Commissioner does not consider the life of the track to be completely exhausted, although he appreciates that the tramcars are not of the standard usually associated with the Oldham passenger transport system. He is prepared, should the cost of repairs to track and rolling stock become unduly high, to permit a sufficient number of buses to supplement the tramway services on the route.

NEW PATENTS

Electrical Specifications Recently Published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1938

1795. "Frequency convertors and circuits therefor." F. H. Stieltjes. January 19th, 1938. (514469.)

3270. "Process and apparatus for continuous impregnation of cables and like articles." W. J. Fraser & Co., Ltd., Callender's Cable & Construction Co., Ltd., F. Peel and R. S. Vincent. February 2nd, 1938. (Cognate application 3271/38.) (514374.)

6610. "Apparatus for the sterilisation of air." Hanovia, Ltd., and H. J. Stoddart. March 2nd, 1938. (514377.)

6894. "Synchronising impulse separator circuits for use in television receivers." Marconi's Wireless Telegraph Co., Ltd., and D. J. Fewings. March 4th, 1938. (514509.)

8932. "Centrifuging electrically heated furnace." Spladis Soc. pour l'Application d'Inventions Scientifiques. December 16th, 1937. (514474.)

10750. "Means of adjusting rotatable control spindles in wireless apparatus." E. K. Cole, Ltd., and A. Shackell. April 8th, 1938. (Cognate application 16811/38.) (514481.)

10849. "Carbon pile electric regulators." F. Newton. April 8th, 1938. (514482.)

10947. "Electrolytic cells." U. Pomilio. April 9th, 1938. (514514.)

13155. "Wireless receiving circuits." Philco Radio & Television Corporation. May 8th, 1937. (514486.)

13178. "Tap-changing gear for electric transformers." May 3rd, 1938. General Electric Co., Ltd., and F. Booker. 514388.)

13237. "Aerial systems." Telefunken Ges. für Drahtlose Telegraphie. May 4th, 1937. (514390.)

13260. "Multiplex radio transmitters and the like." W. A. Beatty. May 4th, 1938. (514394.)

13289. "Driving means for the tuning-indicators of wireless receivers." General Electric Co., Ltd., and S. G. Hunter. May 4th, 1938. (514399.)

13298. "Television and like systems." Baird Television, Ltd., and T. C. Nuttall. May 4th, 1938. (514401.)

13312. "Electric motor control systems." English Electric Co., Ltd., E. A. Binney, H. S. Pound Corner and H. B. Sedgfield. May 4th, 1938. (Cognate applications 26224/38 and 5787/39.) (514433.)

13336. "Electrical remote or other control, indicating or signalling systems." H. S. Petch and Metropolitan-Vickers Electrical Co., Ltd. May 4th, 1938. (514406.)

13435. "Reduction of interference in electric signal transmission systems." Electric & Musical Industries, Ltd., and W. S. Percival. May 5th, 1938. (Addition to 467263.) (514439.)

13464. "Conductors for high-frequency electric cables having air-space insulation." Siemens & Halske Akt.-Ges. May 5th, 1937. (514412.)

13469. "Systems of transmission of high-pressure electrical energy." British Thomson-Houston Co., Ltd. May 5th, 1937. (514442.)

13479. "Short-circuited rotors for induction motors." B. Schwarz. May 5th, 1938. (514413.)

13540. "Ignition apparatus for internal-combustion engines." D. Napier & Son, Ltd., and F. R. F. Ramsay. May 6th, 1938. (514494.)

13560. "Control of electrically driven reversible rolling mills or the like, for the treatment of strip material." English Electric Co., Ltd., and H. S. Carnegie. May 6th, 1938. (514449.)

13578. "Electrical oscillation generators, amplifiers, and the like." Marconi's Wireless Telegraph Co., Ltd., and E. Green. May 6th, 1938. (514418.)

13612. "Attenuators for electric currents, and connecting means therefor." Standard Telephones & Cables, Ltd., and R. M. Barnard. May 6th, 1938. (514454.)

13613/4. "Electron-discharge devices." Standard Telephones & Cables, Ltd., and F. D. Goodchild. May 6th, 1938. (514455/6.)

13616/7. "Luminescent materials." Franco-British Electrical Co., Ltd., and A. H. Brackensey. May 6th, 1938. (514457/8.)

13641. "Braun tubes." J. T. Shevlin (H. Hinderer). May 6th, 1938. (514463.)

13642. "Insulated fish-plates." J. S. Baines and J. Burns, Ltd. May 7th, 1938. (514464.)

13644. "Socket couplings, switch sockets, and similar electrical accessories." J. A. Crabtree & Co., Ltd., H. F. McLoughlin and B. G. Harrison. May 7th, 1938. (514496.)

13664. "Alternating-current signalling systems." B. M. Hadfield. May 7th, 1938. (514520.)

13669. "Combined electric-lamp holder and light-reflector." J. O. Randle, W. H. Raven, and John Bull Rubber Co., Ltd. May 7th, 1938. (514499.)

13690. "Electrically propelled vehicles." A. C. Morrison, and Associated Electric Vehicle Manufacturers, Ltd. May 7th, 1938. (514501.)

13714. "Time-operated prepayment mechanism for use with electricity." United Gas Industries, Ltd., A. Charles, A. J. Christian, H. E. Angold and N. L. Smith and D. G. Smith. (Executors of the late E. W. Smith.) May 7th, 1938. (514505.)

13729. "Electric fuses." V. Hope. May 9th, 1938. (Cognate applications 14913/38 and 18625/38.) (514522.)

13739. "Electric current-converting apparatus." Marconi's Wireless Telegraph Co., Ltd. May 8th, 1937. (Cognate applications 13740/38 and 13741/38.) (514523.)

13776. "Magnetic compasses." P. F. Everitt, A. J. Hughes and H. Hughes and Son. May 9th, 1938. (514526.)

13786. "Photo-electric relay." Photoswitch Inc. September 16th, 1937. (514528.)

13835. "Television transmitting apparatus." Fernseh Akt.-Ges. May 8th, 1937. (514539.)

13836. "Control gear for electric motors." British Thomson-Houston Co., Ltd., T. H. Petch, junr., and H. W. C. Liddiard. May 9th, 1938. (514540.)

13879. "Television and like systems." Baird Television, Ltd., and T. C. Nuttall. May 10th, 1938. (514554.)

13897. "Switch-operating mechanism for electric signalling-circuits." P. C. J. Spray. May 10th, 1938. (514558.)

13914. "Electric ovens." General Electric Co., Ltd., and D. G. W. Acworth. May 10th, 1938. (514561.)

13946. "Thermionic amplifiers." Standard Telephones & Cables, Ltd. June 22nd, 1937. (514567.)

13966. "Electrical resistances." B. H. N. H. Hamilton. May 10th, 1938. (514570.)

15358. "Type-printing telegraphy." Olivetti & Cie Soc. Anon, and G. Beccio. May 23rd, 1938. (514575.)

16327. "Means for damping vibrations between electric contacts." J. A. Crabtree & Co., Ltd. (Schiele Industriewerke). June 1st, 1938. (514578.)

16391. "Housings for high-voltage electrical apparatus." Claude-General Neon Lights, Ltd., and C. Higgins. June 1st, 1938. (514585.)

16645. "Printing-telegraph apparatus." Marconi's Wireless Telegraph Co., Ltd. June 10th, 1937. (514588.)

31490. "Supply systems for high-voltage, high-frequency apparatus." H. Kikucji. November 22nd, 1937. (514547.)

1939

4387. "Supple and dilatable electrode for short-wave and diathermic current treatments." F. P. C. Benoit. February 11th, 1938. (Cognate applications 4388/39 and 4380/39.) (514466.)

13335/6. "Electric motor control systems." English Electric Co., Ltd., E. A. Binney, H. S. Pound-Corner, and H. B. Sedgfield. May 4th, 1938. (Divided out of 514433.) (Cognate applications 13337/39 and 4389/39.) (514466.)

22775/6. "Prepayment meter mechanism." R. C. Graseby. February 4th, 1938. (Divided out of 512931.) (514596/7.)

27045. "Manufacture of leading-in wires for electric lamps and the like." Edison Swan Electric Co., Ltd., and A. Hannaford. April 22nd, 1938. (Divided out of 513946.) (514599.)

27092. "Photo-electric relay." Photoswitch, Inc. (September 16th, 1937. (Divided out of 514528.) (514600.)

TRADE MARK APPLICATION

THE following is among the recent applications for British trade marks.

Objections against the proposed mark may be entered within one month from November 29th.

Halls-Prene. No. 609167. Class 17 [IV]. Electrical insulating materials, &c.—Hall & Hall, Ltd., Oldfield Works, Hampton, Middlesex.

A.E.I. Men on Service

ALL the companies constituting Associated Electrical Industries, Ltd., have announced a scheme for allowances to employees serving with H.M. Forces.

Subject to certain conditions an *ex gratia* allowance will be made to certain employees based upon the difference between the employee's pay in the company at the time of joining the Forces and his Service pay, as follows.—To a married man, the full difference; to a single man with dependants, such part of the difference as the company considers to be appropriate in each case; to a single man without dependants, such part of the difference as is required to cover the employee's premium payments, if any, on behalf of pension; and to an employee who marries while serving with the Forces, such part of the difference as the company considers appropriate in each case.

The allowances will be payable on the condition that the recipient makes a proper allowance to his dependants. Arrangements can be made for such allowance to be paid direct by the company to the dependants.

The scheme covers male employees twenty-one years of age and upwards who have had at least one year's service with the company at the time of joining H.M. Forces.

In any case where the employee's pay in H.M. Forces is equal to or greater than his pay in the company at the time of joining the Forces, the company will nevertheless grant him an *ex gratia* allowance of such amount as is required to cover his premium payments on behalf of pension.

Every effort will be made to reinstate in the employment of the company those serving with H.M. Forces who present themselves for employment immediately after discharge or demobilisation, but it will be realised that as the effect of war on the company's business and the condition of its business at the end of the war cannot be foreseen, it is impossible for the company to give any guarantee on this point.

FINANCIAL SECTION

New Companies. Returns of Capital. Debenture Charges. Bankruptcies and Liquidations. Reports of Electrical Companies. Dividend Announcements. Stocks and Shares

New Companies Registered

Universal Plastics, Ltd.—Private company. Registered November 30th. Capital, £3,000. Objects: To carry on business as manufacturers of and dealers in bakelite and other materials used in the manufacture of plastic and moulded articles and goods of all kinds, &c. Directors: A. E. Herdman (chairman), 41, Haverfield Road, Bow, E.3, G. Fraser, 98, Rathcole Gardens, Hornsey, N.8, and J. J. Lock, 41, Haverfield Road, Bow, E.3. Secretary: A. E. Herdman. Solicitors: J. C. Fox Gamble & Son, Balfour House, Finsbury Pavement, E.C.

Notley Power Units, Ltd.—Private company. Registered November 27th. Capital £10,000. Objects: To carry on business as general engineers, manufacturers of and dealers in power, petrol, Diesel electric and other motors, generators, &c. The directors are: J. Torre Bett, 60, Knightsbridge, S.W.3, B. Edwards, The Park, Nottingham, and H. C. Notley, 29, West Avenue, Pinner, Middlesex. Registered office: 618, London Road, Isleworth, Middlesex.

Companies' Returns

Statements of Capital

Edmundsons Electricity Corporation, Ltd.—Capital, £10,000,000 in £6,750,000 ordinary stock units of £1, £400,000 7 per cent. cumulative preference stock units of £1, £1,513,685 6 per cent. cumulative preference stock units of £1, 850,000 ordinary and 486,315 6 per cent. cumulative preference shares of £1. Return dated June 14th, 1939. All stock taken up. £3,570,400 paid on 1,920,400 ordinary stock, 400,000 7 per cent. preference stock and 1,250,000 6 per cent. preference stock. £5,093,285 considered as paid on remainder. Mortgages and charges, £4,312,032.

W. Mackie & Co., Ltd.—Capital, £12,000 in £1 shares. Return dated October 12th. 7,500 shares taken up. £3,155 paid. £4,345 considered as paid. Mortgages and charges nil.

Blakoe Appliances, Ltd.—Capital £4,000 in 3,900 preference and 100 ordinary shares of £1. Return dated August 29th, 1939. 1,000 preference and 100 ordinary shares taken up. £1,026 paid on 1,000 preference and 26 ordinary shares. £74 considered as paid on 74 ordinary shares. Mortgages and charges nil.

Killamarsh & District Electric Supply Co., Ltd.—Capital £6,000 in £1 shares. Return dated October 21st, 1939. 4,725 shares taken up. £4,725 paid. Mortgages and charges nil.

Mortgages and Charges

Union Lamp & Lighting Co., Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated November 20th, 1939, to secure £4,950. Holder: Comdr. Wm. G. Gerard, United Service Club, Pall Mall, S.W.1.

Young & Wildsmith.—Issue on October 26th, 1939, of £500 debentures, part of a series already registered.

Receivers Appointed and Released

Cecil Newling, Ltd.—Cyril H. Appleby, of Aldwych House, Aldwych, W.C.2, ceased to act as receiver and/or manager on November 21st, 1939.

Owen Smith (Swansea), Ltd.—P. O. Williams, of 2, Worcester Place, Swansea, was appointed receiver on November 22nd, 1939, under powers contained in debenture dated September 18th, 1937.

Modern Refrigerator Sales, Ltd.—Leave of Court obtained for the appointment of W. H. Partridge, of 14, Cranley Gardens, Muswell Hill, N., as receiver and manager on November 18th, 1939, under powers contained in debenture dated February 1st, 1939.

G. Lawrance & Co., Ltd.—Leave of Court obtained for the appointment of John W. Lodge, of Lloyds Bank Chambers, Truro, Cornwall, as receiver and manager on November 14th, 1939, under powers contained in debenture dated February 20th, 1933.

Private Arrangements

H. M. Fletcher, trading as Electricalities, 2-3, Kay Buildings, Southport, electrical factor.—A meeting of the creditors was held recently, when the statement of affairs disclosed liabilities totalling £1,426. The net assets were £599, leaving a deficiency of £827. The present position was attributed to stoppage of building in the district and giving extended credit to customers. In addition the debtor had experienced difficulty in obtaining supplies and collecting amounts due to him. It was decided that a deed of assignment should be executed to Mr. F. E. Bendall, of Poppleton & Appleby, as trustee, with a committee of inspection.

Company Liquidations

T.K. Products (Liverpool), Ltd., wholesale wireless and electrical dealers, Upper Newington, Liverpool.—At the statutory meeting of the creditors of the above held recently at Liverpool a statement of affairs was submitted showing liabilities of £357. The net assets were £29, leaving a deficiency, as regarded the creditors, of £328. The deficiency was mainly accounted for by the losses on the trading, bad debts and losses in connection with motor vehicles obtained on hire-purchase terms. It was reported that the shareholders had passed a resolution nominating Mr. J. Larkin, C.A., 12, Church Street, Liverpool, as liquidator of the company.

Armstrong's Radioelectric Service, Ltd.—Meetings January 2nd, at 185-188, High Holborn, London, W.C.1, to receive an account of the winding up by the liquidator, Mr. C. Latham.

G. F. Latham, Ltd.—Particulars of claims by December 29th, to Mr. J B. Yearsley, 27, Brazennose Street, Manchester, liquidator.

Eca-Ray (Sales), Ltd.—Meetings December 28th, at Balfour House, Finsbury Pavement, London, E.C.2, to receive an account of the winding up by the liquidators, Messrs. A. C. Cripwell and W. R. Baskett.

Radioland, Ltd.—Winding up voluntarily. Liquidator, Mr. E. S. Hall, 24, Bennetts Hill, Birmingham.

Bankruptcy Proceedings

C. F. Adams and **F. Harris,** lately trading as Swift Bros., electrical engineers, 351, Forest Road, Walthamstow.—The public examination of these debtors was held on November 29th at the London Bankruptcy Court before Mr. Registrar Kean. The joint statement of affairs showed liabilities £1,157, and assets estimated to produce £76. Replying to the Official Receiver, debtor Adams said that they started trading together in 1921 at Tottenham with a capital of £100. In 1929 they moved to Forest Road, and the trade steadily increased until by 1933 they were making over £500 a year profit. In 1938, owing to the failure of a number of book debtors, they lost about £750. Later creditors began to press, and a meeting of creditors was called, but in the meantime bankruptcy proceedings.

The examination was then concluded.

E. M. Jones, electrical engineer, 26, Eastgate, Aberystwyth.—First and final dividend of 3s. 7d. in the £, payable at 4, Queen Street, Carmarthen.

W. J. Williams, electrical engineer, trading as Williams and Parry, at 81, High Street, Pwllheli.—First and final dividend of 1s. 9d. in the £ payable December 15th at the Official Receiver's office, St. Peter's Churchyard, The Cross, Chester.

Reports and Dividends

Crompton Parkinson, Ltd.—The report and statement of accounts for 1938-39 of this company which have now been issued, confirm the figures given in the preliminary statement published in our last issue. The net profit is £404,903 (against £402,046), which with £71,626 brought in, makes £476,529 available. Reserve receives £125,000, central benevolent fund £5,000, and the final dividend on the ordinary and "A" ordinary shares is 7½ per cent., making 15 per cent. for the year. In addition a special cash bonus of 5 per cent. (against 15 per cent.) is paid on the ordinary and "A" ordinary shares, leaving a balance of £81,392 to be carried forward. As already stated, the gross dividends payable on the ordinary and "A" ordinary shares for 1938-39 will absorb the same total amount as in 1937-38 due to the issue in December, 1938, of a special scrip bonus of 50 per cent.

As in previous years a copy of the speech to be made by Mr. Frank Parkinson (chairman), at the annual meeting on December 15th has been issued with the report and accounts. In this Mr. Parkinson says that the year is not an easy one to review owing to the influence of international tension upon trading conditions throughout the first eleven months of it and of actual warfare during the final month. Such a result as shown by the accounts under review is therefore evidence that the group of undertakings under the company's ownership is a well-balanced unit capable of adjusting itself rapidly to changes in conditions. They are making in the prosecution of the war.

The company commences the new financial year with a particularly full order book and there is every prospect that throughout the war the national demand upon their capacity for electrical equipment of all kinds will continue to be very heavy. There are, however, dangers in the tendency of prices to rise unduly, the growing scarcity of labour, and the omission to provide sufficiently for the requirements of the export trade. Each is said to be receiving attention from one Department or another of the Government, but in his opinion they are all phases of a central problem calling for a cohesive policy. The difficulties of maintaining export business during wartime are considerable, but it is essential that they should avoid a repetition of the unfortunate experience of the last war, when, owing to the restrictions imposed, British trade suffered a setback from which it has not yet recovered. The company's factories which are established in Australia and India will be of considerable value in helping them to retain and expand their business in those markets. These factories are fully equipped and in full production.

The company has undertaken that those employees who serve with H.M. Forces shall not be embarrassed financially in consequence of such service.

The purchase of the Gaiety Theatre site had been completed and the detailed plans were well advanced for the erection of a new building, designed to provide not only an office and showrooms for the company, but also additional accommodation for letting off, which would have provided a substantial source of revenue. The outbreak of war, has made it necessary to defer their plans for rebuilding.

Marco Refrigerators, Ltd., reports a net profit for the year to Septemebr 30th of £2,967, as compared with a loss of £2,191 in the preceding year, and a credit balance of £961 is carried forward (against a debit of £2,006 brought in). Sales of land resulted in a profit of £7,003 which is carried to reserve. It is proposed to use part of this to writing off preliminary expenses of £2,969.

The India Rubber, Gutta Percha & Telegraph Works Co., Ltd., reports a

(*Continued on p.* 749)

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE business has lapsed into quietude. The inactivity on the war fronts, excepting that of the sea, appears to be laying a check upon the enterprise of capital. Probably money is being kept in hand for the purposes of January's taxes. Prices keep notably firm. Company reports and dividends are, in most cases, satisfactory. Yet little happens to ruffle the passivity of markets as a whole.

Gilt-edged Firmness

The gilt-edged market reacted with reassuring firmness to political news which put investment nerves to something of a test. Last week's news from Finland brought down the price of War Loan from 92⅝ to 91⅛, but recovery to 92⅜ followed quickly. War Loan is setting the tone for Stock Exchange markets as a whole. Consequently this steadiness under pressure has put heart into the majority of other markets. People are asking whether the new Savings Certificates and Defence Bonds are coming into competition with the Government market issues, since the former both offer attractive yields and are proof against depreciation. The usual answer is to the effect that a considerable volume of money is being diverted, in small amounts, from the market, but that, in relation to the capacity of the big investors, the amount involved is not depriving the gilt-edged market of support to any serious extent. Stocks of the Central Electricity and London Transport Boards remain difficult to buy at the higher prices established over the last few weeks.

Electricity Supply

Judged by the present stability of prices in the market for electricity supply shares, it seems that the adjustment of yields to fit the new conditions has been completed to the general satisfaction. Discrimination has evidently decided that the London companies' difficulties—as underlined in the Central London undertaking's apologia for the increase in prices—call for a yield on their shares which leaves a margin for dividend contingencies. Hence the yields of 5¾ per cent. upwards on County of Londons, "City Lights," Metropolitans, London Associated, and so on. Government intentions to allow the moderate use of electric signs are expected to help matters to an appreciable extent. The returns of 4½ per cent. to 5 per cent. on several of the leading provincial and Scottish companies' shares reflect a confident view of the electricity prospects in many parts of the country. In this range are Midland Counties, Northamptons, Scottish Power, Yorkshire Electric and Clyde Valleys. The average yield of 5 to 5½ per cent. to be obtained from, for instance, Edmundsons, North-Easterns, Lancashire Electrics and Bournemouth and Poole compares well with returns on leading industrial shares.

Equipment and Manufacturing

Up to now the insatiable demand for electric batteries has attracted attention chiefly to the 5s. shares of Every Ready, which have, in consequence, the distinction of standing at the highest price of the year. At 25s. they show a yield of 6 per cent. on the dividend, reduced last year from 35 to 30 per cent. Chloride Electrical Storage shares have this week come in for more attention, the price being half-a-crown higher, at 70s., although this is still some way below the year's best point of 82s. 3d. For the last year the dividend was lowered from 20 to 15 per cent. The yield of well under 4½ per cent, on the latter basis is due, in part, to an unusually impressive balance sheet and earnings position. Reyrolle shares, quoted on much the same low-yield basis, and for much the same reason, are also in demand at 56s. 3d., which is 2s. 6d. higher than it was a fortnight ago. English Electric shares are strong at 32s. 6d. In company with the General Electric and Associated Electrical, this is one of the few big companies which pay a single annual dividend. These companies usually make the payments in February, July and April respectively, so that the English Electric decision is not far off. J. Lucas shares are again 1s. 3d. to the good, at 53s. 9d., and remain in request.

The Course of Prices

Charts and indices which mark the course of security prices are the subject of a good deal of attention in these times, either as matter of ordinary interest, or as a clue to things to come. After three months of war the figures are particularly interesting. They show that the average prices of gilt-edged securities, for instance, have risen by about 5 per cent. since the last days of August. Debenture and preference stocks make an even better showing, and railway ordinary stocks have advanced. Industrial shares have lost ground on the average, but are only about 3 per cent. below their pre-war values. Comparison with the prices ruling twelve months ago does not, of course, read so well; but there has been a striking advance in practically all sections since the end of last September. Incidentally, industrial shares are shown to be standing roughly on a level with the quotations obtaining in mid-1933, when the boom which culminated at the end of 1936 was getting into its stride.

Dividends and Reports

Current company reports, such as those lately issued by Tube Investments and Crompton Parkinson, are frequently providing the industrial markets with useful moral support. Boards of directors, moreover, continue to be reasonably generous in the distribution of available profits, in contrast to the tendency towards ultra conservatism shown in the first weeks of the war. A further satisfactory report has come from Ensign Lamps, profits being a shade above last year's and the dividend repeated at 25 per cent. The 5s. shares stand at 15s., yielding £8 6s. 8d. per cent. Crompton Parkinson's full accounts confirmed the good showing of the preliminary figures and the 20 per cent. dividend. Revo Electric is paying 5 per cent. interim dividend as it did for last year when the total distribution was 17½ per cent. At 25s. the shares return a round 7 per cent. at that rate. Vactrics have decided to postpone consideration of the preference dividend payment until the figures for the full year are known. In the electricity supply group the maintenance of Edmundsons' interim payment at 2½ per cent. had been taken for granted. Palestine Electric "A" shares were disturbed by the decision to defer the payment of an interim dividend, which was at the rate of 2½ per cent. tax-free last year. At 25s. the price has lost 1s. 3d. of the recent rise. East African Power gained 1s. to 23s. 6d. xd. on the repetition of the 3 per cent. interim dividend. Globe Telegraph is making the usual quarterly payment of 1¼ per cent.

Miscellaneous Matters

In the course of a month Cable and Wireless ordinary stock has risen from 45½ to 53¼; the preference from 78½ to 92½; and the income stock from 87½ to 91½ xd. Prices reacted momentarily on last week's Finland news, but lost no time in returning to their former levels. Home Railway stocks have lost some of their buoyancy owing to the continued failure of the Government compensation terms to make their appearance. Southern Railway preferred, at 63, shed 2 of the previous week's jump of 7½ points. Tillings have strengthened to 38s. 9d. British Electric Traction issues have regained their accustomed steadiness after last month's flutter caused by the change in dividend policy. In the foreign traction group, Rio 5 per cent. bonds go from strength to strength, this week's gain of 5 points taking the price to 75 (against 55 six weeks ago). Brazilian Tractions have risen to 10¼.

The Insatiable Investor

More than one reference was made here last month to the rises which were taking place in the prices of preference shares of the best electricity supply companies. On two different occasions the quotations in the Stock Exchange official list of the preference shares in this group were raised by 6d. or 1s. each, yet without any business appearing against the prices to indicate that any shares had changed hands. The automatic improvement, as it may be called, is due to persistency of demand rather than to any activity in the market. People who had bought shares some time ago are beginning to press for delivery in those cases where the shares have not yet come in; and, in the effort to effect this delivery, dealers in the market are bidding what look to be high prices, failing even then to satisfy their full requirements.

Nowadays investment is content to accept anything between 4½ and 5 per cent. on the money from the security of front-rank preference shares, in which class the majority of electricity supply preference issues can be included. The debenture stocks in this group are more than ever hard to come by, and although the market makes an effort every now and then to attract stock, the process of putting up prices, by which it is hoped to effect this end, seems to serve to confirm holders in the retention of their interests.

Apathy in Americans

Large amounts of American dollar stocks and shares are held in this country by people who bought them for investment, and who have returned them, of course, in accordance with the requirements of the British Government which demands that all American stocks and shares held in this country shall be notified to the Treasury. Upon this being announced in the first place, it was regarded as a bull point for American stocks and shares, more especially as the further impression became general that America offers a reasonably safe area of financial security, and that its shares are less liable to shocks than are securities domiciled on this side of the Atlantic. Prices of American stocks and shares, however, have lately shown a tendency to droop, and disappointment is felt at the failure of anticipations to materialise.

The reason for this failure lies in the obvious fact that there are now no buyers of American stocks and shares except the Americans themselves. From this country money is not allowed to be exported, save in exceptional circumstances, and the same limitation is applied, more or less, to the Continental nations. Deprived of these useful sources of support, the American Stock Exchanges are left to the local investor for absorption and maintenance of value.

America, with its huge amount of gold, has still nine or ten millions of unemployed; and, with all its armament orders, is still struggling with economic problems. Consequently the American investor requires a good deal of persuasion to induce him to buy his own stocks and shares, and the result, surprising as it is to many people on this side of the Atlantic, is a natural consequence of the embargo laid upon the export of European capital. Knowledge of forthcoming increase in American taxation is another potent reason for to-day's dullness in American industrials. Of the Canadian dollar shares, Shawinigan and Montreal both show a dollar rise this week.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1939 High-est	1939 Low-est	Dividend Pre-vious	Dividend Last	Price Dec. 5	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole	68/3	57/–	15	15	58/9	—	5 2 0
British Power and Light	30/9	21/–	7	7	26/–	—	5 7 8
City of London	33/9	23/6	7½	7½	25/–	—	6 0 0
Clyde Valley	37/9	27/6	8	8	33/3	—	4 16 3
County of London	46/9	28/–	10½	10½	36/3	—	5 16 0
Edmundson's :							
7% Pref.	31/6	27/6	7	7	28/–	—	5 0 0
Ord.	27/9	18/6	9	6	23/6xd.	—	5 2 2
Elec. Dis. Yorkshire	41/6	32/6	9	9	35/9	—	5 0 5
Elec. Fin. and Securities	47/9	40/–	12½	12½	40/–	—	6 5 0
Elec. Supply Corporation	51/9	41/–	12	12	41/3	—	5 16 0
Isle of Thanet	20/–	15/–	4	4	15/–	—	5 6 8
Lancs Light and Power	34/6	25/–	7½	7½	28/9	—	5 4 4
Llanelly Elec.	22/6	17/6	5½	5½	18/–	—	6 2 3
Lond. Assoc. Electric	30/–	18/3	7	7	18/3	—	7 13 4
London Electric	34/3	22/6	7	7	26/3	+1/6	5 6 8
London Power Deb. Red.	106½	98	5	5	103½	—	4 16 6
Metropolitan	51/–	35/–	12	12	37/–	—	6 9 9
Midland Counties	38/9	30/–	8	8	35/–	—	4 11 5
Mid. Elec. Power	41/9	35/–	8	9	36/3	—	4 19 4
Newcastle Elec.	28/9	26/–	7	7	26/3	—	5 6 8
North Eastern Electric :							
Ordinary	32/3	23/6	7	7	27/6	—	5 1 10
7% Pref.	32/6	27/6	7	7	30/–	—	4 13 4
Northampton	48/–	41/–	10	10	42/6	—	4 15 0
Notting Hill 6% Pref. (£10)	12½	11½	6	6	11½	—	5 4 4
Northmet Power :							
Ordinary	46/6	30/6	10	10	37/6	—	5 6 8
6% Pref.	29/–	23/6	6	6	27/–	—	4 9 0
Richmond Elec.	29/–	21/6	7	7	23/9	—	5 18 0
Scottish Power	38/9	28/6	8	8	32/6	—	4 18 6
Southern Areas	22/9	17/–	5	5	18/–	—	5 11 1
South London	30/9	23/9	7	7	22/–	—	6 7 3
West Devon	23/3	18/9	5	5	18/9	—	5 6 8
West Glos	21/3	16/3	2	2½	16/3	—	3 1 6
Yorkshire Elec.	38/6	28/9	8	8	33/9	—	4 14 10
Overseas Electricity Companies							
Atlas Elec.	4/3	1/6	Nil	Nil	3/–	—	—
Calcutta Elec.	39/–	25/–	10*	10*	30/6	—	—
Cawnpore Elec.	34/6	28/3	10	10	27/6	—	—
East African Power	26/3	20/–	7	7	23/6xd.	+1/–	5 19 2
Jerusalem Elec.	24/6	21/–	7	7	21/–	—	6 13 4
Kalgoorlie (10/–)	10/6	9/–	7½	7	10/–	—	7 0 0
Madras	31/–	21/3	8*	8*	21/3	—	—
Montreal Power	35½	30	1½	1½	33½	+1	—
Palestine Elec. "A"	29/6	20/–	7½*	5*	25/–	–1/6	4 0 0
Perak Hydro-electric	18/9	13/6	6	2½	18/3	—	2 14 9
Shawinigan Power	25	20	85cts.	83cts.	25	+1	—
Tokyo Elec. 6%	63	37	6	6	62½	—	9 12 0
Victoria Falls Power	73/9	60/–	12½	15	70/–	—	4 5 9
Whitehall Investments Pref.	19/6	12/6	7½	7½	14/–	—	10 14 2
Public Boards							
Central Electricity :							
1950–70	112	103	5	5	106½	—	4 14 0
1955–75	115½	104½	5	5	108	—	4 12 6
1951–73	106½	101	4	4½	103xd.	—	4 7 3
1963–93	95½	84	3½	3½	88	—	3 19 7
London Elec. Trans. Gtd.	88½	83	2½	2½	87	—	2 17 6
London & Home Counties							
1955–75	107½	105	4½	4½	107	—	4 4 1
Lond. Passenger Transport :							
A	114½	103	4½	4½	107½	—	4 4 6
B	117½	102	5	5	105½	—	4 14 9
C	83½	64½	4	1½	65	—	2 6 2
West Midland Joint Elec.,							
1948–68	112½	104½	5	5	106	—	4 14 4
Telegraph and Telephone							
American Tel. & Tel.	210	159	9	9	210	—	4 5 8
Anglo-Am. Tel. :							
Pref.	101½	82	6	6	92½	+1	6 9 9
Def.	23⅜	18½	1½	1½	21½	—	6 19 6
Anglo-Portuguese	24/–	17/6	8	8	20/–	—	8 0 0
Cable & Wireless :							
5½% Pref.	95½	75	4½	5½	92½	—	5 19 0
Ord.	55	34	4	4	53½	—	7 9 7
Income	100	87½	—	—	91½xd.	—	4 7 5
Canadian Marconi $1	6/–	3/9	—	Nil	5/–	—	—
Globe Tel. & Tel.:							
Ord.	31/3	23/6	7½*	7½*	27/6xd.	+3d.	5 9 1
Pref.	26/9	22/6	6	6	25/–xd.	—	4 16 0
Great Northern Tel. (£10)	38	24	20	20	24½	—	8 3 4
Inter. Tel. & Tel.	10½	5½	Nil	Nil	6½	—	—
Marconi-Marine	30/–	23/–	7½	10	26/3	—	7 12 4
Oriental Telephone Ord.	2½	46/3	12*	12*	2⅛	—	5 4 0
Radio Corpn.	8⅞	5⅝	8	6	7½	—	—
Telephone Props.	14/–	12/9	5	6	13/9	—	8 14 6
Telephone Rentals (5/–)	10/–	7/–	10	10	7/9	–3d.	6 9 0
Western Union	40½	19½	2½	—	35½	—	—
Traction and Transport							
Anglo-Arg. Trams :							
First Pref. (£5)	7/6	3/6	Nil	Nil	5/–	—	—
4% Inc.	16	5	Nil	Nil	13	—	—
British Electric Traction :							
Def. Ord.	1025	515	5	5	700	—	—
Pref. Ord.	164	130	8	8	142	—	5 12 8
Bristol Trams	52/6	36/3	8	10	42/–	—	4 15 5
Brazil Traction	13	7½	$1	50c.	10½	+½	—
Calcutta Trams	25/6	20/9	8	8	21/3	—	7 10 6
Cape Elec. Trams	18/–	16/9	5	5	17/6	—	5 14 4
Lancs Transport	37/9	27/6	10	10	30/–	—	6 13 4
Mexican Light :							
1st Bonds	28	20	5	5	27½	—	—
Rio 5% Bonds	81	47	5	5	75	+5	6 13 4
Southern Rly. :							
5% Prefd.	75½	48	5	5	63	–2	7 18 9
5% Pref.	99½	79	5	5	88	—	5 13 8
T. Tilling	2½	32/6	10	10	38/9	+6d.	5 3 3
Tilling & B.A.	54/6	43/9	10	9*	45/–	—	4 2 3
West Riding	37/9	30/–	10	10	30/–	—	—
Equipment and Manufacturing							
Aron Electricity Ord.	32/3	22/6	15	15	22/6	—	—
Assoc. Elec. :							
Ord.	45/3	31/3	10	10	40/–	—	5 0 0
Pref.	36/6	31/3	8	8	32/6	—	4 18 6
Automatic Telephone & El.	47/6	39/3	10	12½	42/6	—	5 17 8
Babcock & Wilcox	48/–	37/–	10	12½	40/9	—	6 2 7
British Aluminium Ord.	58/9	48/9	12½	12½	51/3	—	4 17 5
British Insulated Ord.	88/–	72/6	20	20	80/–	—	5 0 0
British Thermostat (5/–)	16/–	12/–	18½	18½	12/6	—	7 8 0
British Vacuum Cleaner (5/–)	22/6	12/6	40	40	12/6	—	—
Brush Ord.	5/9	3/9	Nil	Nil	3/9	—	—
Callender's	92/–	52/6	20	15	60/–	—	5 0 0
Chloride Elec. Storage	82/3	62/6	20	15	3½	+⅛	4 5 9
Consolidated Signal	96/–	62/6	36½	36½	65/–	—	9 14 8
Crabtree (10/–)	25/6	17/6	17½	17½	21/3	—	8 4 9
Crompton Parkinson :							
Ord. (5/–)	21/–	12/6	15	20	17/6	—	5 14 3
E. K. Cole (5/–)	9/–	3/–	10	Nil	4/–	–6d.	—
Elec. & Musical Industries (10/–)	14/9	7/–	5	Nil	7/–	—	8 0 0
Electric Construction	38/6	31/–	12½	13½	33/9	—	7 4 5
Enfield Cable Ord.	58/6	42/6	25	16½	45/–	—	7 8 5
Electrical Switchgear (10/–)	27/–	21/–	16	10	21/3	—	4 14 3
English Electric	36/6	25/–	10	10	32/6	+1/9	6 3 1
Ensign Lamps (5/–)	16/9	13/9	25	25	15/–	—	8 6 8
Ericsson Tel. (5/–)	43/–	35/–	25*	25*	37/6	—	3 6 8
Ever Ready (5/–)	25/–	18/–	35	30	25/–	+6d.	6 0 0
Falk Stadelmann	27/–	17/6	10	6	18/9	—	6 13 4
Ferranti Pref.	25/6	22/–	7	7	22/–	—	6 7 3
G.E.C. :							
Pref.	31/9	26/3	6½	6½	27/6	—	4 14 6
Ord.	82/–	61/3	17½	20	75/–	—	5 4 4
Greenwood & Batley	27/6	22/6	7	15	22/6	—	13 6 8
Hall Telephone (10/–)	22/3	18/6	15	15	18/9	—	8 0 0
Henley's (5/–)	21/–	15/–	20	20	17/6	—	5 14 3
4½% Pref.	23/–	18/9	4½	4½	18/9	—	4 16 0
Hopkinsons	46/3	37/3	12½	15	37/6	—	8 0 0
India-Rubber Pref.	21/3	18/9	5½	5½	20/–	—	5 10 0
Intl. Combustion	120/–	97/–	32½	32½	5½	—	6 3 10
J. Lucas	60/–	45/–	15	15	53/9	+1/6	5 11 6
Johnson & Phillips	41/3	32/–	12½	12½	40/–	—	6 5 0
Lancashire Dynamo	72/–	50/–	25	25	2½	—	10 0 0
Laurence Scott (5/–)	12/–	9/6	15	15	9/6	—	7 18 4
London Elec. Wire	31/6	28/6	12	7½	28/9	—	5 4 4
Mather & Platt	50/–	39/–	13½	13½	45/–	—	6 0 0
Metropolitan Elec. Cable Pf.	21/3	21/–	5½	5½	21/3	—	5 3 0
Murex	85/9	63/9	20	20	72/6	–1/6	5 10 4
Pye Deferred (5/–)	13/9	7/6	25	25	7/6	—	16 13 4
Revo (10/–)	35/6	25/–	17½	17½	25/–xd.	—	7 0 0
Reyrolle	61/–	52/6	12½	12½	56/3	+1/6	4 9 0
Siemens Ord.	26/9	18/9	7½	7½	20/–	—	7 10 0
Strand Elec. (5/–)	5/6	2/0	10	4	2/–	—	8 0 0
S. Smith (1/–)	9/–	6/–	37½	50	7/6	—	6 13 4
Switchgear & Cowans (5/–)	15/–	10/–	20	20	11/3	—	8 18 0
Telegraph Condenser (10/–)	7/6	5/–	5	—	7/6	—	—
Telegraph Construction	2½	32/6	10	10	32/6	—	6 3 1
Telephone Mfg. (5/–)	10/–	7/–	9	9	8/–	—	5 12 6
Tube Investments	91/–	72/6	23½	23½	85/–	—	5 11 6
Vactric (5/–)	4/3	2/3	10	4	2/6	—	—
Vickers (10/–)	24/6	14/6	10	10	16/6	–9d.	6 1 3
Ward & Goldstone (5/–)	22/6	19/6	20	20	19/9	—	5 1 3
Westinghouse Brake	54/9	36/–	17½	17½	2½	—	7 15 6
Walsall Conduits (4/–)	31/9	21/3	55	55	25/–	—	8 16 0
West, Allen (5/–)	7/6	5/9	7½	10	5/9	—	8 14 0

* Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Ashbourne.—December 11th. Electricity Department. One six-panel extra-high-voltage switchboard. (December 1st.)

Australia.—SYDNEY.—January 4th. Sydney County Council. Electricity Undertaking. Insulating-oil treatment equipment. General manager.

BRISBANE.—January 15th. City Electric Light Co., Ltd. Two steam boilers and accessories. H. Baskerville, secretary, Boundary Street, Brisbane, Queensland.

Belfast.—December 8th. Electricity Department. Fire extinguishing equipment, mercury arc rectifier equipment and other plant. (November 24th.)

Birmingham.—December 8th. Electric Supply Department High - pressure steam pipework and associated valves and drain pipework for four new boilers and two new turbo-alternators at the Hams Hall "B" power station. (October 20th.)

Dublin.—December 14th. Corporation. two axial-flow sewage pumps, complete with electric motors, switchgear, &c. City treasurer, Exchange Buildings, Lord Edward Street, Dublin (deposit £2 2s.)

Eire.—December 11th. County Donegal Vocational Education Committee. Electric lighting and central heating installations at Stranorlar Technical School; G. V. McLaughlin, architect, Letterkenny.

Halifax.—Town Council. Electrical work in connection with the erection of 25 public air-raid shelters. Borough engineer.

Hutton (NEAR PRESTON).—December 14th. Lancs C.C. Electric lighting in emergency police headquarters. Mr. S. Wilkinson, County Architect, County offices (deposit £2).

Iran.—TEHRAN.—January 6th. Centrale Electrique de Tehran. Electrical plant, including turbo-alternators, high-voltage cable, transformers, &c. (T. 29037/39.)

Leeds.—City Council. Electric goods lift and electrical work at the new nurses' home at the Killingbeck Hospital. Bowman & Sons, architects, 18, Park Row.

Incorporated Association of Electric Power Companies. Electric kettles. (See this issue.)

Manchester.—December 21st. Electricity Committee. One 200-kW and one 40-kW rectifiers. (See this issue.)

New Zealand.—WELLINGTON.—Public Works Department. January 9th (Extended date). 50-kV outdoor switchgear for Hangatiki sub-station and 110 kV outdoor switchgear and steelwork for Ongarue sub-station. (T. 27495/39.)* Four 10,000-kVA transformer units. (T. 27496/39.)*

January 16th. Two sets of 11,000-V metal-clad switchgear. (T. 28857/39.)*

January 23rd.—Four 110 kV three-phase outdoor isolating switches. (T. 29122/39.)*

February 6th. Two motor driven centrifugal pumps. (T. 29120/39.)*

February 13th. Three single-phase transformer units. (T. 28146/30.)* Two 2,250-kVA three-phase boosting transformers. (T. 28144/39.)* Remote control equipment. (T. 28791/39.)*

February 20th. Seven single-phase transformer units (T. 28148/39.)* Four single-phase transformer units. (T. 28147/39.)*

February 27th. 22,000-V switchgear. (T. 28858/39.)* 11,000-V switchgear. (T. 28789/39.)*

March 26th. Four single-phase transformer units. (T. 28143/39.)*

March 12th. 110-kV outdoor switchgear and steelwork. (T. 28145/39.)*

Newcastle-on-Tyne.—Tyne Improvement Commission. Twelve months' supply of electrical accessories and incandescent lamps. A. Blacklock, secretary and manager, Bewick Street.

Salford.—Corporation. December 13th. One 150-kW mercury-arc rectifier equipment. (December 1st.)

South Africa.—CAPE TOWN.—January 15th. Electricity Department. Booster pumps, complete with driving motors, &c., and piping, two sets of motor starting and control gear, two 3,300-V iron-clad switchboards, two 380/220-V iron-clad distribution boards and one overhead travelling crane. (T. 27966/39.)*

JOHANNESBURG.—January 6th. Fire-fighting equipment. (T. 28771/39.)*

Stone.—December 9th. U.D.C. Sewage and storm-water pumping plant, with electric motor drive, comprising five vertical-spindle centrifugal pumps in the new pumping station. C. H. Matthews, clerk, Town Hall (deposit £2 2s.).

West Riding.—County Council. Electric lighting at the Grenoside and Pontefract Institutions. Architect, County Hall, Wakefield.

Wolverhampton.—December 18th. West Midlands Joint Electricity Authority. Coal storage plant for Ironbridge power station. (November 24th.)

Orders Placed

Birkenhead.—Assistance Committee. Accepted. Electric motor and starter for mechanical stokers at institution (£41).—G.E.C.

Electricity Committee. Accepted. Feeder unit (£95).—Crompton Parkinson. Circuit-breaker (£113).—A. Reyrolle & Co.

Birmingham.—Markets and Fairs Committee. Accepted. Electrical installation at the new wholesale fruit market.—Walker Bros.

Cheshire.—County Council. Accepted. Traffic signal alterations at Swan Street, Wilmslow (£268).—Automatic Telephone & Electric Co.

Guildford.—Education Committee. Accepted. Installation of electricity at Stoke C. of E. School (£389).—R. A. Champion.

Manchester.—Electricity Committee. Accepted. Sub-station switchgear (twelve months' requirements). — Bertram Thomas; Parmiter, Hope & Sugden. Renewal of plates on air heater of No. 15 boiler, Barton power station.—James Howden & Co. (Land). Neutral earthing resistor, Barton power station.—Ferguson, Pailin.

Sheffield.—Electricity Committee. Accepted. Auxiliary switchgear for Blackburn Meadows power station (£4,594).—Crompton Parkinson.

Southport.—Electricity Committee. Accepted. Switchboard alterations (£1,473) and e.h.v. switchgear for three years.—Ferguson, Pailin.

Warrington.—Electricity Committee. Accepted. Switchgear (£5,000).—Ferguson, Pailin.

Worksop.—Town Council. Accepted. Transformer and control board (£273).—Electric Construction Co.

Financial Section (*Concluded from page 746*)

Reports and Dividends—cont'd

trading profit for the year ended September 30th of £120,329, as compared with £90,928 in the preceding year, and after providing for depreciation, debenture interest, directors' and auditors' fees, there is a balance of £60,485 (against £32,609). The fixed dividend of 6 per cent., plus 2 per cent., is paid on the preferred ordinary shares (same), and the fixed dividend of 6 per cent., plus 3 per cent., on the ordinary shares (same). The balance carried forward is £59,096 (against £33,361 brought in).

Dictograph Telephones, Ltd., report a trading profit for the year to August 31st of £27,473, as compared with £30,550 in the preceding year, and a net balance of £20,569 (against £23,968). The dividend for the year is 7 per cent. (against 10 per cent.), general reserve receives £2,500 and war reserve £2,500. The balance carried forward is £6,469 (against £4,468 brought in).

Vactric, Ltd., reports a trading profit for the year to September 30th of £3,029. as compared with £21,750 in 1937-38, and after making various provisions, there is a loss of £11,118 (against a profit of £8,775), less £429 brought in, leaving a debit of £10,689 to be carried forward.

Broom & Wade, Ltd., propose to pay a final dividend of 15 per cent., making 22½ per cent. for the year to September 30th. The net profit is £83,107, an increase of £22,564 as compared with the preceding year.

S. Smith & Sons (Motor Accessories), Ltd., are paying a final dividend of 14 per cent. on the preferred ordinary shares, making 21 per cent., less tax, for the year (same), and a dividend of 50 per cent., less tax (same) on the deferred for the twelve months. The net profit for the year to August 5th is £232,503, an increase of £12,010, as compared with the preceding year.

Aveling-Barford, Ltd., are paying an interim dividend of 5 per cent., tax free, on £200,000 ordinary shares. This is at the same rate as for the previous year but is paid on capital since increased by a bonus of 25 per cent.

The Palestine Electric Corporation, Ltd., has declared the half-yearly dividend on the 4½ per cent. redeemable cumulative preference shares, and the 4½ per cent. second redeemable cumulative preference shares, but the directors have decided to defer consideration of a dividend on the ordinary and "A" ordinary shares until the accounts for the full financial year are available. Last year an interim dividend of 2½ per cent., tax free, was paid.

The East African Power & Lighting Corporation is maintaining its interim dividend at 3 per cent.

The Pennsylvania Water & Power Co., has announced a quarterly dividend of $1 per share (against $1.50).

The Revo Electric Co., Ltd., is again paying an interim dividend of 5 per cent.

John Shaw & Sons, Wolverhampton, Ltd., report a profit of £4,400 for the year to June 30th (against £7,470 for 1937-38). The dividend is maintained at 4 per cent. and £10,474 is carried forward (against £10,338).

The Globe Telegraph & Trust Co. has declared a quarterly dividend of 1¼ per cent. (same).

Hick Hargreaves & Co., Ltd., are paying an interim dividend of 2 per cent. (unchanged).

The Electric & General Investment Co., Ltd., is maintaining its interim dividend at 2½ per cent.

The British Columbia Power Co. is paying a quarterly dividend of 50 cents per "A" share (same).

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bacup.—Works shelters (£12,000), for Joshua Hoyle & Sons, Ltd., India Mill; A. Duckett, secretary.

Bolton.—Alterations, Halliwell Road clothing works; Montagu Burton, Ltd.

Birkenhead.—Houses, Homelands estate, Oxton; Boulton's (Prenton), Ltd.

Premises for St. Werburgh's junior school, Park Grove; Education Committee.

Birmingham.—Offices and warehouses, High Street, Bordesley; Hoskins & Sewell, Ltd.

Premises, Moat Lane; Howard Chapman, Ltd., 14, West Smithfield, London, E.C.

Bootle (LANCS).—Extensions to works, Cyprus Road; Felix Holt, architect, 5, Tithebarn Street, Liverpool.

Bromsgrove.—Houses (31), Redditch Road, Alvechurch, near Birmingham; F. H. Boer, builder, Shalcoat, Alcester Road, Mapleborough, near Dudley.

Houses (22), Withybed Green, Alvechurch; E. S. Gee, Alvechurch.

Burnley.—Two schools, for E.C.; borough surveyor.

Cardiff.—Underground shelter, Wood Street; borough surveyor.

Cheltenham.—Temporary church, Uckington; C. H. Denley.

Chester-le-Street.—Offices; R.D.C. surveyor.

Air-raid shelters for the U.D.C. Contractors: H. F. Mole, Broadwood View, and F. W. Mole, Low Chare.

Clitheroe.—Shelters, various sites; borough engineer, Town Hall.

Croydon.—Headquarters fire station (£7,500); borough surveyor.

Derby.—Extension scheme, Derbyshire Royal Infirmary, London Road; secretary.

Infant and senior schools, Normanton, for E.C.; borough surveyor.

Durham.—Club and totalisator at the Belmont Greyhound Stadium; Tom Sharp, Belmont Greyhound Stadium, Durham.

East Riding.—Decontamination centre, Pocklington, for C.C.; county surveyor, County Hall, Beverley.

Edinburgh.—Shelters, Letham Park, and North and West Leith; burgh surveyor.

Enfield.—Shops, Baker Street, and houses, Burnham Close; Dover & Co., architects, 18, Western Mansions, Western Parade, New Barnet.

Houses (22), Selwyn Crescent; D. Thomson.

Houses (36), Ordnance Road; E. Pollex.

Houses (11), Ashton Road; W. Goodchild & Co.

Church, Vera Avenue; C. A. Farey.

Flaxton.—Development, Bargain Lane; Cowling & Swift.

Gateshead.—Extensions to factory, Team Valley Estate, for Fibreboard Boxes, Ltd.; H. E. Pitt, Ltd., builders, Leopold Street, Sunderland.

Factory for Atlas Wood Workers, Ltd., at North-Eastern Trading Estate; J. W. Hanson & Son, architects, Eldon Square, Newcastle.

Glamorganshire.—A.R.P. cleansing stations at Penarth and Whitchurch police stations, for C.C.; county architect, Glamorgan County Hall, Cardiff.

Glasgow.—Large alterations, 41-47, Argyle Street, for Morrisons (Gowns), Ltd.

Great Ayton (YORKSHIRE).—Layout of estate; W. Winn, Newton Road.

Halesowen.—Temporary accommodation at Hagley Green Hospital; W. Parkes, Blackheath, Birmingham.

Halifax.—Electrical work, public air-raid shelters, various sites, for T.C.; D. T. Lloyd Jones, borough surveyor, Crossley Street.

Hanley.—Houses, Werrington Road; H. Clowes.

Hull.—School shelters (£32,800); borough surveyor.

Hyde.—Tuberculosis pavilion and X-ray Department at Back Bower Hospital; borough surveyor.

Keighley.—A.R.P. work at elementary schools (£10,000); borough surveyor.

Kettering.—Additions to the Boot & Shoe Union Offices in Club Street (£3,000); Phillips & Slow, contractors, Hallwood Road, Kettering.

Liverpool.—Proprietors of Reece's Restaurant propose extensive alterations and modernisation; Joseph Emberton, architect, 136, Regent Street, London, S.W.1.

Construction of air-raid shelter in basement, Bank Buildings, Water Street, for the Martins Bank, Ltd., 7, Water Street; W. Moss & Sons, Ltd., contractors, Roscoe Street, Liverpool.

London (CATFORD).—Three-storey extension, 32-33, Catford Broadway; H. A. Scrase & Partners.

LEWISHAM.—Extensions, 299-303, Hither Green Lane; Kinnear, Moodie & Co.

ST. PANCRAS.—A.R.P. depôts, Bangor Wharf, and Bartholomew Road, N.W.1, for Council; C. S. Bainbridge, architect, Town Hall, Euston Road, N.W.1.

WALTHAMSTOW.—Two fire stations (£28,900), for B.C.; borough engineer, Town Hall.

Longton (STAFFS).—Rebuilding premises, High Street; Evans & Sons.

Manchester.—Additions to works at Nelson Street, Miles Platting; J. W. Beaumont & Sons, architects, 53, Spring Gardens.

Rebuilding branch bank at Pendleton for Martins Bank, Ltd., 7, Water Street, Liverpool; C. Musker Bros., Ltd., contractors, Bingham Street, Swinton, Manchester.

Mansfield.—Joint school clinic and maternity and child welfare centre; borough engineer, Town Hall.

Mexborough.—Alterations, Commercial Hotel; Knight & Co., architects, 48, Moorgate, Rotherham.

Montgomeryshire.—School, Meifod, for E.C.; H. W. Jones, director of education, Education Offices, Newtown.

Motherwell.—Air-raid shelters (£24,000). Motherwell and Cambusnethan, for T.C.; L. Costley, architect, Town Hall.

Newcastle-on-Tyne.—Rebuilding Portland Hotel; Tate & Holmes, contractors, Benwell, Newcastle.

Northampton.—Store, South Bridge Wharf; A. W. Darby.

Northern Ireland.—(BELFAST).—Office block (two-storey), Linenhall Street, for Yorkshire Insurance Co., Ltd.; R. H. Gibson, architect, Temperance Buildings.

Oxfordshire.—School, Bicester, for E.C.; G. R. Hutton, architect, County Hall, Oxford.

Improvements (£9,566), Littlemore Senior School, for C.C.; director of education, County Offices, Oxford.

Paignton.—Additions, Isolation Hospital; U.D.C. surveyor.

Bungalows (132), Foxhole Road; Mid-Devon Estates, Ltd. Bungalows, Eden vale Grove; W. H. Mead & Sons.

Potters Bar.—Fire and ambulance station, Mutton Lane; U.D.C. surveyor.

Preston.—Assembly centre for Y.M.C.A. at Deepdale; Hubert A. Thomas, architect, Prudential Buildings, 36, Dale Street, Liverpool.

Rotherham.—Works additions, Grange Mill Lane; Ambrose, Shardlow & Co., Ltd.

Salford.—Works additions, Liverpool Street; John Morris & Sons, Ltd.

Scarborough.—Alterations in Westbourne Grove for the North Riding C.C.; county architect, County Hall, Northallerton.

Houses, Sandybed Lane; C. J. Wilson, architect, Cross Lane, Scarborough.

Alterations in York Place for J. F. Ellis; Jones & Rickaby, architects, 102, Westborough, Scarborough.

Air-raid shelters at schools for the E.C. Contractors: E. Hunter and F. W. Plaxton.

Sheffield.—Houses (45), Hammerton Road and Walkley Lane; Simpson Bros. (Sheffield), Ltd., 95, Dixon Road, Hillsborough, Sheffield, 6.

Houses (28), Richmond Park Road and Athelstan; E. Cooper, builder, Shirebrook House, Townend, Gleadless.

Bakery extensions, Lowther Road; G. H. Fletcher & Son, Ltd., 82, Middlewood Road, Owlerton, Sheffield, 6.

Buildings for Technical College (£450,000); city surveyor.

Skerton (LANCS).—Church (£17,000); Rev. H. G. Moss.

South Shields.—Cinema, Ocean Road, site of Grand Electric Cinema; J. H. Morton & Sons, architects, Martins Bank Chambers, Fowler Street.

Staines.—Factory, Poyle; Faulkner & Co.

Extensions to factory; Spun Concrete, Ltd., Littleton Lane.

Stockport.—Church; A. Brocklehurst, architect, Martins Bank Buildings, 10, Norfolk Street, Manchester.

Stockton-on-Tees.—Air-raid shelters at schools for the E.C. (£20,000); L. Brown & Son, Tarslag, Ltd., and A. E. Hobbs, of Stockton, and Bolton & Hayes, Ltd., of Bolton.

Stoke-on-Trent.—Estate development for Mr. J. Bould, Weston Coyney Road; Adams & Edwards, architects.

Sutton Coldfield.—Shops and houses, Chester Road; King & Townsend.

Thornaby-on-Tees.—Hotel, Lane House Road, for J. W. Cameron & Co., Ltd.; J. C. Watson, builder, Prudential Buildings, Stockton-on-Tees.

Warrington.—Power house, off Liverpool Road; J. Crosfield & Sons, Ltd.

West Bromwich.—Rebuilding bakehouse, Carters Green; T. L. Ralphs.

West Riding.—Decontamination centre, Victoria Road, Mexborough, for C.C.; county architect, Wakefield.

Whaley Bridge.—Houses, Jodrell Road; S. Drinkwater & Son, Canal Street.

Whitley Bay.—R.C. school (£20,000); R. Burke, architect, Singleton House, Northumberland Road, Newcastle.

Willington Quay (NORTHUMBERLAND).—Cleansing station; W. W. Tasker, Council Offices, Mitford Road Morpeth.

Wiltshire.—Automatic telephone system, Pewsey Mental Colony, for C.C.; county architect, County Offices, Trowbridge.

Winchester.—Fire stations at Botley, Hamble and Hound, for R.D.C.; E. G. Breed, surveyor, 45, Romsey Road, Winchester.

Windsor.—Extensions, King Edward VII Hospital.

York.—Shop, Dringhouses; York Co-operative Society, Ltd.

Conversion of Red Lion Hotel, Micklegate, to fire station; city engineer.

Training Apprentices

SPEAKING at the annual prize distribution ceremony at the Burnley Municipal College, Dr. Willis Jackson, professor of electro-technics at Manchester University, said it was one of his hopes for the future that the large industrial concerns of the country would accept the responsibility of training apprentices not only for themselves but also for smaller concerns whose training facilities were of necessity inadequate.

His suggestion was that one or two apprentices selected and "subsidised" should be trained for one or more years in some similar concern in Manchester. The amount of money involved would not be large, since it would merely be necessary to supplement the boys' wages while in Manchester to an amount sufficient to support them in lodgings. If any firm felt inclined to act on this, he would do all he could to make the necessary arrangements at the Manchester end.